THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES.

EDITED BY

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&c. &c. &c.

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TO READERS AND CORRESPONDENTS.

We have received a letter from Dr. W. F. Wade, of Birmingham, England, the author of "a very interesting case of Aortic Aneurism, in which a communication with the pulmonary artery was recognized during life by means of Physical Diagnosis," published in the volume of Medico-Chirurgical Transactions for 1861, and reviewed in our No. for April last, p. 473, calling our attention to a misprint of his name. We regret this mistake, and will ask our subscribers to correct it in their copies.

The following works have been received:—

Transactions of the Obstetrical Society of London. Vol. IV. For the year 1861.* With a list of Officers, Fellows, &c. London: Longman & Co., 1862. (From the Society.)

Public Health in relation to Air and Water. By W. T. Gairdner, M. D., F. R. C. P. E., Lecturer on the Practice of Medicine, &c. Edinburgh: Edmonston & Douglass, 1862. (From the Author.)

On Intestinal Obstruction by the Solitary Band. Being a paper read at a meeting of the Medical Society of London, March 25, 1861, and reprinted from their Transactions. By John Gay, F. R. C. S., Surgeon to the Great Northern Hospital, &c. &c. London, 1861. (From the Author.)

De l'Application de la Suture Enchevillée à l'Opération de l'Entropion Spasmodique au Moyen d'une Nouvelle Espèce de Cheville (cheville jumelle ou à double branche). Par F. Vauquelin, Médecin Oculisté et Auriste à Paris, &c. Paris: Germer-Baillière, 1853. (From the Author.)

Rapport fait à la Société Universelle d'Ophthalmologie par le Secrétaire Provisoire. F. Vauquelin, et Descours d'Ouverture par Francesco de Argelagos. Versailles, 1861.

A Manual of Medical Diagnosis: being an Analysis of the Signs and Symptoms of Disease. By A. W. Barclay, M. D., F. R. C. P., Assistant Physician to St. George's Hospital, &c. &c. Second American from the second and revised London edition. Philadelphia: Blanchard & Lea, 1862. (From the Publishers.)

Handbook of Surgical Operations. By Stephen Smith, M. D., Surgeon to Bellevue Hospital, New York. Baillière Brothers, 1862. (From the Author.)

A Practical Guide to the Study of the Diseases of the Eye: their Medical and Surgical Treatment. By Henry W. Williams, M. D., Fellow Massachusetts Medical Society, &c. &c. Boston: Ticknor & Fields, 1862.

Experiments and Observations upon the Circulation in the Snapping Turtle, Chelonura Serpentina, with especial reference to the Pressure of the Blood in the Arteries and Veins. By S. Wier Mitchell, M. D., Lecturer on Physiology. Philadelphia, 1862. (From the Author.)

A Description of the Newly Invented Elastic Tourniquet, for the Use of Armies and Employment in Civil Life: its Uses and Applications, with Remarks on the different Methods of arresting Hemorrhage from Gunshot and other Wounds. New York, 1862.

Extension and Counter Extension in the Treatment of Fractures of the Long Bones, with a description of an Apparatus especially designed for Compound Fractures. By Joseph H. Vedder, M. D. Flushing, L. I. New York, 1862.

Advice to a Mother on the Management of her Offspring. By Pye Henry Chavasse, F. R. C. S., &c. &c. Reprinted from the sixth London edition. New York: Ballière Brothers, 1862.

Quarterly Summary of the Transactions of the College of Physicians of Philadelphia. From September 4, 1861, to February 5, 1862, inclusive. Philadelphia, 1862.

Proceedings of the Academy of Natural Sciences of Philadelphia. January, February, March, April, 1862.

Mortuary Tables of San Francisco. Arranged by A. F. Sawyer, M. D., January, 1862. San Francisco, 1862. (From the Author.)

The Action of the Voluntary Muscles. By Louis Mackall, M. D. Alexandria, 1862. (From the Author.)

The Annual Address before the Medical Society of the State of New York, and the Members of the Legislature, delivered in the Capitol, February 6, 1862. By Edward H. Parker, M. D., President of Society. Poughkeepsie, 1862. (From the Author.)

Address before the Philadelphia County Medical Society. Delivered January 30, 1862. By Joseph Carson, M. D., at the close of his official term as President. Printed by order of the Society. Philadelphia, 1862. (From the Author.)

An Address delivered before the Buffalo Medical Association, April 1, 1862. By Dr. C. C. F. Gay, President of the Association, on retiring from the chair. Published by vote of the Association. Buffalo, 1862.

Valedictory Address to the Graduating Class of the Cincinnati College of Medicine and Surgery. Delivered February 12, 1862. By A. H. Baker, M. D., Professor of Surgery. Cincinnati, 1862.

Forty-fifth Annual Report on the State of the Asylum for the Relief of Persons deprived of their Reason. Published by direction of the Contributors. Philadelphia, 1862. (From Dr. J. H. Worthington, Physician and Superintendent.)

Second Annual Report of the Superintendent of Clifton Hall, a Private Hospital for Mental Diseases, to the Board of Supervision, for the year 1861. Philadelphia, 1862. (From R. A. Given, M. D.)

Fourth Annual Report of the Medical Board of the Charity Hospital of Philadelphia to the Board of Trustees, January 1, 1862. Philadelphia, 1862. (From Dr. A. M. Slocum.)

The following Journals have been received in exchange:—

Gazette Médicale de Paris. February, March, 1862.

Annales Médico-Psychologiques. Redégé par MM. les Docteurs Baillarger, Cerise, et Moreau (de Tours). January, 1862.

Gazette Hebdomadaire de Médecine et de Chirurgie. Redacteur en chef, A. DECHAMBRE. Tom. IX., Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22. 1862.

Journal de Médecine de Bordeaux. Redacteur en chef, M. COSTES. January, February, March, 1862.

Edinburgh Medical Journal. March, April, 1862.

British and Foreign Medico-Chirurgical Review. April, 1862.

The Glasgow Medical Journal. April, 1862.

The Dublin Quarterly Journal of Medical Science. May, 1862.

Medical Times and Gazette. April, May, June, 1862.

Dublin Medical Press. March, April, May, 1862.

The Medical Critic and Psychological Journal. Edited by FORBES WINSLOW, M. D., D. C., L. Oxon. April, 1862.

London Medical Review. March, April, 1862.

The Madras Quarterly Journal of Medical Science. January, 1862.

The Medical Record of Australia. Edited by Dr. REEVES, January, 1862.

The British American Journal. Edited by ARCHIBALD HALL, M. D. March, May, 1862.

Boston Medical and Surgical Journal. Edited by F. E. OLIVER, M. D., and S. L. ABBOT, M. D. April, May, June, 1862.

American Medical Times. April, May, June, 1862.

The Cincinnati Lancet and Observer. Edited by ED. B. STEVENS, M. D., and J. A. MURPHY, M. D. April, June, 1862.

Ohio Medical and Surgical Journal. Edited by the Professors of Starling Medical College. March, May, 1862.

The American Journal of Insanity. Edited by the Medical Officers of the New York State Lunatic Asylum. April, 1862.

The American Journal of Science and Arts. Edited by Professors B. SILLIMAN, B. SILLIMAN, Jr., and JAS. D. DANA. May, 1862.

The Chicago Medical Journal. Edited by D. BRAINARD, M. D., and J. A. ALLEN, M. D. April, May, June, 1862.

The Chicago Medical Examiner. Edited by N. S. DAVIS, M. D., and F. W. REILLY, M. D. March, April, May, 1862.

Buffalo Medical and Surgical Journal and Reporter. Edited by JULIUS F. MINER, M. D. April, May, June, 1862.

American Medical Monthly. Edited by J. H. DOUGLAS, M. D. April, May, June, 1862.

The Pacific Medical and Surgical Journal. Edited by JAMES BLAKE, M. D. February, March, April, May, 1862.

The Cincinnati Medical and Surgical News. Edited by A. H. BAKER, M. D., and J. A. THACKER, M. D. March, April, May, 1862.

San Francisco Medical Press. Edited by E. S. COOPER, A. M., M. D. April, 1862.

The American Journal of Ophthalmology. Vol. I., No. 1. Julius Homberger, M. D., editor and proprietor. New York. July, 1862.

American Journal of Pharmacy. Published by authority of the Philadelphia College of Pharmacy. Edited by Wm. Proctor, Jr., Professor of Pharmacy in Philadelphia College of Pharmacy. May, 1862.

The American Druggists' Circular and Chemical Gazette. April, May, June, 1862.

The Dental Cosmos. Edited by J. D. White, M. D., J. H. McQuillan, D. D. S., and Geo. J. Ziegler, M. D. April, May, 1862.

Communications intended for publication, and Books for Review, should be sent, *free of expense*, directed to Isaac Hays, M. D., Editor of the American Journal of the Medical Sciences, care of Messrs. Blanchard & Lea, Philadelphia. Parcels directed as above, and (carriage paid) under cover, to Messrs. Trübner & Co., Booksellers, No. 60 Paternoster Row, *London, E. C.;* or M. Hector Bossange, Lib. quai Voltaire, No. 11, *Paris*, will reach us safely and without delay. We particularly request the attention of our foreign correspondents to the above, as we are often subjected to unnecessary expense for postage and carriage.

Private communications to the Editor may be addressed to his residence, 1525 Locust Street.

All remittances of money, and letters on the *business* of the Journal, should be addressed *exclusively* to the publishers, Messrs. Blanchard & Lea.

☞ The advertisement-sheet belongs to the business department of the Journal, and all communications for it should be made to the publishers.

To secure insertion, all advertisements should be received by the 20th of the previous month.

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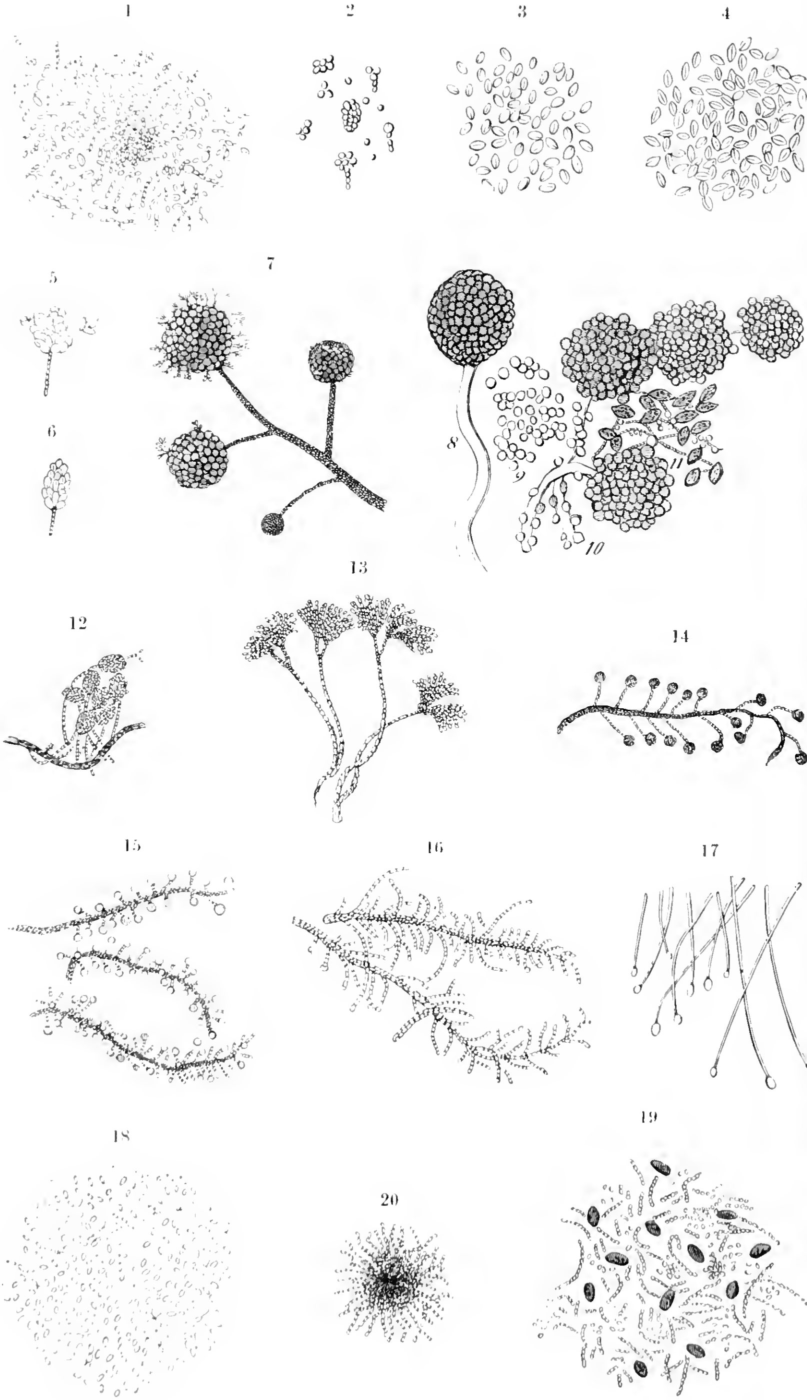
PLATE I.

Am. Jour. Med. Sciences, vol. xliv.



THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR JULY 1862.

ART. I.—*Remarks on Fungi, with an account of Experiments showing the Influence of the Fungi of Wheat Straw on the Human System; and some Observations which point to them as the Probable Source of "Camp Measles," and perhaps of Measles generally.* By J. H. SALISBURY, M.D., of Newark, Ohio. (With a plate containing twenty figures.)

THE fungi belong to the lowest types of vegetable existence. Unlike the higher orders of plants, they are developed almost entirely in darkness (not being able to decompose carbonic acid under the influence of light), and they depend upon decaying or decomposing organic matter for the materials of their growth. They differ from flowering plants in their chemical influence upon the air. Like animals, they absorb oxygen and give out carbonic acid. Decay is an essential condition to their development. Besides organic decomposition, a certain degree of heat and moisture must exist. These three conditions are requisite, to excite their vegetative activity—but in very different degrees in the different families. There is another peculiarity; their cells contain a large percentage of nitrogenized matter, making their composition more analogous to animal matter, than to the higher orders of plants. Their growth and maturity are usually rapid—requiring often but a few hours—and with almost equal rapidity they decay. The odours they emit in decay are more like those of putrescent animal than of vegetable matter. There are exceptions to this, however, in those families where their textures are of an almost woody firmness and of a slow growth, as in many of the *Polypori* and *Boliti*.

The fungi are variously distributed among organized nature; each species growing only upon such bodies (even though the temperature and moisture be rightly adapted) as will furnish to it the materials from which it can make the proximate products that are peculiar to it. For instance, the

gory dew and red snow (*Protococcus nivalis*) form invariably a peculiar red secretion, to which they owe their colour; and they will grow only where they can obtain the elements to form this red matter. The yeast plant (*Penicillium*) invariably forms an albuminous secretion, and it will vegetate only in bodies which can supply the materials for this substance. From this it would appear that peculiar states and combinations of organized matter control mainly the developmental distribution of parasitic fungi. The spores planted in their proper soil, only demand in addition a certain amount of moisture and degree of temperature—these present, they rapidly develop.

Those *Fungi* known by the common name of mould, mildew, smut, &c., attach themselves to and are developed from living tissues as well as from dead organic matter; yet in both cases they depend alike upon decay for their development.

In plants we have common examples of this in the *Uredo*, which attacks the maize plant; the *Secali*, which attacks the rye plant; the *Puccinea*, which attacks the rose bush; the *Botrytis infestans*, which causes the potatoe rot; the *Merulius lacrymans* and *Polyporus destructor*, which cause *dry rot* in timber; the *Spharia morbosa*, which attacks plum trees; the *Oidium*, which produces decay in fruit; the *Penicillium* and *Aspergillus*, which attack bread and cheese; and the yeast and vinegar plants, which are submerged stems or mycelia of the *Penicillium*. The savin or juniper tree is attacked by a peculiar genus—*Podisoma*—which bursts from the bark and swells under the influence of moisture to a gelatinous mass; and the black irregular scars on apples are produced by the *Spilocena fructigena*.

Others attack the housekeepers' preserved fruits, paste, mustard, and even clothing. Others the farmers' grain and grass; the vintigers' grapes; and the gardeners' vines, vegetables, and flowers. Scarcely any vegetable production, either living or dead, escapes the ravages of these parasites.

Animals also have their parasitic *fungi*. The disease (in Italy and the South of France) termed *Muscadine*, which sometimes attacks the caterpillars of the silkworm in large numbers, just when they are about to enter the chrysalis state, has been ascertained to be due to the growth—within their bodies—of a minute fungus (*Botrytis bassiana*) nearly resembling the common mould.

It is capable of being communicated from one individual to another. It spreads in the fatty tissue beneath the skin, occasioning its destruction. The fungus spreads by the extension of its own stems and branches, and by the production of numerous sporules, which in their turn vegetate, and finally produce the death of the worm.

The flies found adhering to our windows are destroyed by a mould (*Sporendonema musca*) which produces the little white rings between the abdominal segments and discharges its spores upon the glass around like a

little cloud. In the West Indies, it is not at all uncommon to see individuals of the species *Polistes* (a wasp-like insect) flying about with plants, their own length, projecting from some part of the body. In time this growth spreads through the whole body, causing death; after which the plants grow with much more luxuriance from the dead body than they formerly had from the living.

A similar growth (*Cordyceps Robertsii*) takes place in the bodies of certain caterpillars in New Zealand, Australia, and China. Some of our American caterpillars are destroyed by the *Cordyceps militaris*. The *Onygena exigua* attacks the hoofs of the horse, and the hoofs and horns of cattle. (The *Isaria felina* is found in the feces of cats deposited in dark and obscure places.)

In certain diseased conditions of the cutaneous surface—in man—named *Porrigo favosa* and *Sycosis menti*, a considerable development of fungous vegetation takes place; and the same has been discovered to be true of the white patches (*Aphthæ*) on the lining membrane of the mouth in children, which are known as *thrush*. In all these cases, however, a certain morbid condition of the animal fluids must exist in order that the germs of the fungus may develop themselves; so that the condition, rather than the presence of the fungus must be looked upon as the essence of the disease.[1] The individual cells and spores of the *Fungi* are microscopic, and so light that they are suspended in and borne about by the air. They are so minute that they permeate alike the tissues of animals and plants. Whenever it happens that the spores enter matter that is suited to their sustenance, and the proper amount of heat and moisture are present, they rapidly develop. It would be very strange if very many abnormal conditions of living tissues were not produced by this insidious vegetation. The plants being mostly microscopic, and requiring often but a few hours for their development and decay, renders their discovery one fraught with far greater difficulty than would at first be supposed. When no development of the spores takes place in the tissues, no doubt in many instances they exercise a deleterious influence by their presence alone, as many of the larger and better known fungi have been ascertained to possess peculiar poisonous properties, which, in their action on the human system, resemble much in their depressing effects the animal poisons.

With these preliminary remarks we enter upon—

Some observations connected with measles and the fungi of wheat straw.

Hon. J. Dille, of Newark, Ohio, came to my office on the evening of the 9th of December last, and stated that he was just recovering from what he believed to be an attack of measles. It was his opinion he had caught them from pitching straw from an old stack. He stated that on December 4th he pitched from an old stack a load of straw, and unloaded it in his stable.

[1] Carpenter's General and Comparative Physiology.

Portions of the stack had become partially decayed, and was already steaming with the heat of incipient decomposition. In pitching over and picking out the best straw the air became filled with a fine dust, which he freely inhaled. The dust tasted and had the odour of old straw. This took place during the forenoon. His throat soon began to feel dry and irritated. When he returned to dinner, he could still taste and smell the old straw. This taste and smell he could not get rid of. During the following night he awoke with a very sore throat, which became much worse by morning. After getting up and dressing he was taken with a severe chill, with pains in the head and back, and felt so sick and prostrated that he was compelled to return to bed again, where he remained through the day. The chill was followed by a high fever and severe pains in the head, so much so that a portion of the time he was delirious. He felt a heavy congested feeling about the chest, his throat and fauces were swollen and inflamed, with severe catarrhal symptoms. An eruption like that of measles appeared on his face and neck, and the *old straw* taste still continued. His fever continued high through the following (Thursday) night, with severe pains in the head.

Friday, December 6th, he felt much better, and was able to be up around the house. The fever and catarrhal symptoms had partially subsided. His eyes were sensitive, watery, and inflamed.

Saturday, December 7th, felt much better. The eruption had passed downward over the whole body, and had begun to disappear from the face. He rapidly recovered, so that on Monday, December 9th, he was moving about the streets. In the evening of the 9th he called at my office. His eyes were still red, inflamed, and sensitive; throat sore, dry, and voice hoarse, and had a heavy congested feeling still about the chest. The blotches on his face could be faintly distinguished. He stated that he could still taste the old straw in his throat.

Measles at Camp Sherman.—At the military camp—Camp Sherman—Newark, Ohio, the measles first appeared on Dec. 4th, the same day that Mr. Dille exposed himself to the straw dust. From Nov. 23d to 30th, the weather was cool, damp, with considerable sleety rain and snow. During this time (there being between six and seven hundred men in camp), many of the tents were furnished with ticks, which were filled with straw for the men to sleep on. In the centre of each tent was a fire, built in a hole in the ground, from which the smoke was led off by an underground flue, extending to the outside of the tent. The straw ticks were arranged around the fire, several in a tent, and each tick accommodated two men. On Dec. 1st, the weather became colder and snow fell to the depth of about an inch. On the 2d—which was quite warm—this melted and wet the soil and dampened the straw ticks. Dec. 4th, the measles made their first appearance in Camp Sherman. The men came from different parts of the county, and no one knew that he had been exposed to the disease. Some had been in camp two weeks, and no one supposed to have that disease had visited the camp. Subsequent inquiries have failed to discover any one who brought them there, or to account for their appearance from the contagion of the disease. On the first day (Dec. 4th) there were eight cases, and within a week after there were forty. The disease then disap-

peared for 10 or 12 days from its first appearance. Between the 14th and 16th the disease again made its appearance, and within a few days there were between forty and fifty cases more, when the disease ceased altogether. These last cases, occurring so near the usual time at which the disease ordinarily makes its appearance after exposure, renders it probable that they were communicated from the first cases.[1]

On the 3d of Dec. it became warm and pleasant as growing weather in spring—and continued warm and delightful till Dec. 10th. On the 11th and 12th it was cold and freezing. The 13th and 14th were cool. From the 15th to the 21st the weather was warm and pleasant.

The following is the statement of Mr. S.—"In November, 1842, I returned home from school on a Friday. My father had the threshers, with a machine, threshing wheat. The wheat had been stowed away in the mow and in a couple of stacks outside the barn. It had undergone a slight heating, and some of the straw was mouldy. In threshing, the barn was filled with a fine dust, which tasted and smelled of old straw. I was on the straw stack all Friday afternoon and the whole of Saturday. About 4 P. M., Saturday, I became very chilly; throat and fauces became sore and swollen; a tightness and congested feeling about the chest; eyes inflamed and sensitive; and severe pains through the head and shoulders with a feeling of weariness. Following the chill, came on a high fever with increased pains and throbbing in the head and severe catarrhal symptoms. I do not remember of ever passing a more disagreeable night. The next day (Sunday) had a high fever, with severe pains in head, back and limbs; eyes swollen and sensitive, and considerable thin mucous secretion from the nose and fauces. Towards evening a few blotches made their appearance on my face. The following day (Monday) I felt rather better; the fever and catarrhal symptoms had partially subsided, and my face and neck were completely covered with blotches. My father immediately remarked that I had measles. This surprised us all, as I had not been exposed to the disease, there being none in the town where I was attending school, or in the vicinity. In the course of a couple of days, my whole body and limbs were covered with the eruption. The disease passed off like a case of ordinary measles, leaving no bad effects, save inflammation of the mucous membrane of the eyes. This I did not get rid of till the warm weather of the following spring. In from seven to fourteen days after the eruption commenced in my case, all my brothers and sisters (seven in number) were in bed with the genuine measles. My eldest brother attended school with me, and returned home when I did. These were the only cases of measles anywhere in the vicinity during that fall and winter. In my attack the disease commenced with much greater violence than in either of the others. The fever ran higher and there was greater disturbance about the head, chest, and throat."

Bearing upon this may be mentioned the circumstance that in almost every instance, where our soldiers have gone into camp; in a short time after—the disease—called *camp measles*, has made its appearance, without

[1] For these facts I am indebted to Hon. J. Dille, and the Assistant Surgeon Dr. James Hood.

any previous exposure—so far as known—to the measles. It should also be stated that their beds have been usually straw.

At the monthly meeting of the "*Farmer's Club*," near Newark, Ohio, last month, several of the farmers stated to Mr. Dille, that it was quite common, after threshing wheat, for persons who had been exposed much to the dust, to be taken with severe chills; followed by a high fever, catarrhal symptoms and an eruption on the face. None of them could state, that any one had ever had the attack twice; nor whether they had known any cases to follow the threshing of any other kind of grain than wheat.

It is well known among swine growers, that when they bed their hogs in straw, they are affected with an eruption in the throat, fauces and roof of mouth, accompanied with coughing.

Microscopical Examination of the Fungi of Wheat and Rye Straw.—With these observations before us, we deemed the subject one worthy of a further and more careful examination; an examination which would afford something more positive. With this view, the fungous growths of wheat straw, and the dust rising from it when disturbed, were carefully examined under the microscope. The straw used for this purpose was taken from the beds at Camp Sherman, from Mr. Dille's stable, and from stacks in the vicinity of Newark. The accompanying drawings (see Plate, Figs. 1 to 14) represent the plants found—a description of which is given further on.

We then took clean bright wheat straw—free from fungi—packed it firmly into a box about one foot square and high, wet it with about four ounces of cold well-water, pressed on and secured the lid, and set the box near the stove in the office, where the temperature ranged from 60° to 75° Fahr. Twenty-four hours afterwards I opened the box, and found the straw in the centre of the box heated and covered with a short white mould. As the straw was stirred, a fine dust of spores and cells were disengaged, and rose in the air, which, when inhaled, had the odour and taste of old straw. Examined the fungi under the microscope. The plants were in all stages of development, from those just starting to those with matured sporangia.

Again the straw was moistened, the lid secured as before, and left for forty-eight hours. The box was then opened. Found the mould had extended wider through the mass and more completely covered the straw. Submitted the plants to a further careful examination under the microscope. Figs. 15, 16, 17, 18, 19, and 20, are drawings made from fungi grown in the box.

We further varied the experiments in a variety of ways, and found that whenever the straw was exposed to a certain temperature, under the influence of darkness and moisture, fungi were rapidly developed. We also found that wheat or rye straw when stacked out or housed, unless unusually dry, undergoes a greater or less degree of heating, fermentation or

decay, during which process a variety of fungi are developed, having the appearance of mould or mildew on the straw. When this straw is disturbed or agitated in any way the surrounding air becomes filled with innumerable spores and cells of the broken and comminuted fungi. The individual cells and spores are too minute to be distinguished by the naked eye. They can only be seen when many are together and the air filled with them; then they appear like a thin smoke or fine dust. Suspended in the air they are freely inhaled, tasting and smelling of old straw. This taste and smell is often quite persistent, lasting for hours. The air may be filled with them though invisible to us; but generally their presence can be discovered by the taste and smell. These cells and spores are shown in Plate, Figs. 1, 2, 3, 4, 9, 18, and 19. Those represented at Figs. 1, 18, and 19, make up by far the larger proportion. They are oval, and often several are attached to each other in a line, in the direction of their longest diameter. Figs. 2 and 9 represent spherical spores, much larger than those of Fig. 1, and united generally in masses instead of lines. Figs. 3 and 4 represent large oval spores. Figs. 5 and 6 represent sporangia, which produce the large oval spores 3 and 4. Fig. 6 appears to be a partially broken down sporangium. The plants are of a dull yellowish brown colour; the sporangia of a light greenish yellow white. Fig. 7, a plant which produces the spherical spores 2 and 9. It has four sporangia—two nearly mature and ready to shed their spores and two in process of development. The stems or mycelia of these plants are of a yellowish snuff colour; the sporangia are of a light greenish yellow white. Figs. 8 and 10 represent plants that produce spores like those of Fig. 7. The colour of the mycelia and sporangia are also the same; yet the arrangement of the sporangia on the mycelia seems to differ and may represent a different species. Figs. 11 and 12 are plants with oval or egg-shaped sporangia, which do not exceed one-thirtieth the size of those of 8 and 10. Their colour is an orange brown; the mycelia are lighter. In this species, there is one main stem or mycelium with numerous branches, each bearing one or more spore cases. The branches are mostly made up of a single row of oval cells, like Fig. 1, attached end to end. Fig. 14 represents a plant from the sprout of a wheat kernel. The sporangia are small and nearly spherical. In this species there is a main stem with numerous short branches of nearly equal length, each terminated with a single spore case. The plants are of a light yellowish white colour. This species, or one similar to it, with generally shorter branches, is very common on the straw. Fig. 13 represents plants from the sprout of a wheat kernel. The whole plant appears to be dichotomous; colour, light greenish white. The sporangia are peculiar, being shaped like a tassel, with radiating lines of cells, attached to each other in the direction of their longest diameter, standing upon oval basidia. Fig. 17, plants from a straw that was cut before it had matured. The

plants are white with a yellowish tint. Each plant consists of a single branchless mycelium terminated by a small oval sporangium.

Figs. 14, 15, and 16, are the plants which are by far the most common on the mature straw. They are very prolific; maturing in from twelve to twenty-four hours under favourable circumstances; having the appearance, to the naked eye, of short white mould or mildew, completely coating the stems. When the straw is agitated, the air is filled with thin minute elongated cells and spores, Figs. 1, 18, 19. These plants consist of a main stem—made up of interlacing cells—from which proceed numerous short branches (made up generally of a single line of cells), each one of which is either terminated by a small spherical sporangium or an enlarged cell. The plants Figs. 14, 15, and 16, are mingled together and are probably the same species. The branches of 14 and 15 are terminated with sporangia, while those of 16 are terminated simply by slightly enlarged cells. The plant Fig. 12, in frequency, ranks next to 14, 15, and 16, and is interspersed with them on the straw. When straw that is covered with these plants is slightly or carefully agitated, the cells and spores which are set at liberty and float in the air, are but little aggregated, as seen in Fig. 18. If the straw is agitated violently as in pitching it, the cells and spores set at liberty are more or less aggregated in masses and lines and mingled with them are the sporangia of plants Fig. 12; see Fig. 19. Fig. 20 is a peculiar white fungus, with a light straw tint, which occasionally is met with on the straw. It is, however, not common. The fungi, Figs. 5, 7, 8, and 10, we found generally on straw that had undergone further decomposition than that on which the others were met with.

Inoculation of the Human System with the Spores and Cells of the Fungi of Wheat and Rye Straw.—CASE I. At 10 o'clock P. M., February 11th, 1862, I inoculated my arm with the spores and cells of the fungi of wheat straw, which I obtained by placing a straw—covered with the plants—on a plate of glass, and hitting it with a few slight taps. On removing the straw, under and both sides of it was a white cloudy band, about $\frac{1}{3}$ of an inch wide, running across the glass. These spores and cells lay so thick on the glass, that, to the naked eye, they seemed to touch each other. Their appearance under the microscope is represented in Fig. 1. The straw from which I obtained these cells came from a stack near this place, and was the same kind of straw as that used for beds at the camp. Under the microscope the fungi presented the same appearance, and the cells disengaged in agitating the straw were precisely similar.

Wednesday, Feb. 12th, perfectly well. No inflammation or itching around the point of inoculation.

13th. Slight nausea. A very slight redness and itching at inoculating point.

14th. Got up with a feeling of lassitude and nausea, which continued all day. The redness and itching of inoculating wound increasing; had difficulty in keeping warm; chilly all day; occasional sneezing; eyes sensitive; had a peculiar feeling about the scalp, as if red pepper or mustard had been rubbed into the pores.

Saturday, Feb. 15. Nausea and lassitude continue; occasional sneezing; flashes of heat over the whole body; itching and inflammation of the wound on the arm increasing; thoughtlessly rubbed off the scab, which was about three lines in diameter. The peculiar smarting, burning, congested sensation over the whole scalp, has increased since yesterday. It extends into the bone, with pains through the forehead and temples. A few blotches have made their appearance on the face and neck. Eyes weak and inflamed, so much so that I could not use them to read over half an hour during the evening. A heavy oppressive feeling about the chest; mucous membrane of fauces and throat dry and irritated; feel as if I had a severe cold.

Sunday, Feb. 16. Had a sensation of weariness and drowsiness, with nausea, all day. Eyes red, inflamed, and sensitive; smart, so that I cannot use them to read by gaslight. Whole scalp feels sore, with a constant, congested, burning sensation all through it to the bone. Arm itches; redness as large as a dime. A heavy congested feeling about the chest; have had more or less fever since Saturday morning. Throat and fauces dry and swollen, and voice hoarse. Pains in back and head have been almost constant since Friday last.

Monday, Feb. 17th. The burning sensation of the scalp still continues. Eyes weak and inflamed; cannot use them long at a time, without pain. There is still slight fever and nausea.

Tuesday, Feb. 18th. Nausea; face feels as if it had been exposed to the heat of an open fire till it had become inflamed. The peculiar burning soreness of the scalp is somewhat relieved. Eyes still sensitive; catarrhal symptoms and fever less than yesterday.

Wednesday, Feb. 19th. Very much better; the soreness of scalp almost entirely relieved; blotches and redness of face disappeared; catarrhal symptoms and fever gone; eyes quite well.

CASE II. Wednesday Evening, Feb. 19th. Inoculated myself again in the same place, with the spores and cells of fungi as before.

Thursday, Feb. 20th. Feel perfectly well, except a slight sensitiveness of the eyes.

Friday, Feb. 21st. Same as yesterday.

Sunday, March 2d. Have felt perfectly well since Feb. 21st. Eyes completely recovered.

Monday, March 3d. The last inoculation has produced no effect upon the system, that I can discover.

CASE III. Wednesday Evening, Feb. 19, 1862, inoculated my wife on her arm, with the spores and cells of the straw fungi. The cells were taken from the same group as those used in the second inoculation of my own arm, on the same evening. *

Thursday, Feb. 20th. Perfectly well all day.

Friday, Feb. 21st. During the day, a dry constricting feeling of the throat made its appearance, and grew much worse during the following night. Voice hoarse; has felt chilly through the day, with a feeling of lassitude and drowsiness. Nausea; ate no dinner. Throat and fauces inflamed.

Saturday, Feb. 22d. Nausea; but little appetite; severe pains through the forehead and temples; tongue considerably furred; throat feels dry and inflamed, with a very disagreeable constricting feeling, as if it would close up. A tumid appearance of fauces; voice hoarse; slight fever.

Sunday, Feb. 23d. All through last night her throat felt as if it would close up. Rest very much disturbed. In the morning, throat felt better. Occasional sneezing; voice hoarse; some pain in swallowing. Stupid, weary, and inclined to sleep.

Monday, Feb. 24th. Throat did not trouble her much last night; still hoarse; head stopped up, as if with a cold; towards evening a fulness and throbbing about the head, which felt sore.

Tuesday, Feb. 25th. Had rather a restless night; head feels sore, swollen, and heavy, as with a severe cold; eyes sensitive; catarrhal symptoms severe; heaviness about the chest; slight cough; considerable lassitude and drowsiness; slept from 10 A. M. till 3 P. M.; but little appetite. Had through the day occasional sensations of deafness; slight redness in spots under the skin on the face. During the evening the pains in the head were relieved, and bowels became tender and sore.

Wednesday, Feb. 26th. Had a good night's rest; head relieved; eyes still sensitive; catarrhal symptoms subsiding; chest feels easier; bowels very sore and tender to the touch. Appetite returning; redness on arm nearly gone; slight itching yet.

Thursday, Feb. 27th. Rapidly recovering; head and eyes feel quite well; bowels still slightly tender.

Friday, July 28th, quite well.

It will be seen from this case, that although there was scarcely any perceptible blotches, yet the other symptoms, such as chills, followed by fever, pains in the head, catarrhal symptoms, nausea, lassitude, &c., were all present. The disease commenced in the head, throat, and fauces, and passed downward, the bowels being very sore after the head, throat, and chest were relieved.

CASE IV. On Sunday, March 23d, 1862, Chas. B. Pierce, a fine healthy boy, six years of age, was exposed to measles, by contact with the disease.

March 26th, seventy-two hours after the exposure, inoculated him with the fungi of wheat straw. The fungi were grown in my office, and shaken off from the straw on plates of glass, between which the spores and cells were preserved for use. On the second day after the inoculation (March 28th), a redness appeared around the inoculating point, about the size of a dime. This was preceded and accompanied by catarrhal symptoms resembling a slight cold. Did not complain. Played out of doors every day. This redness at the point of inoculation soon disappeared; the catarrhal symptoms subsided, leaving no bad effects; and on April 2d, he was perfectly well. Forty-two days have passed since this boy was exposed to the disease, and there are no signs of measles yet.

CASES V. to IX. Mr. Bartholomew, of Newark, Ohio, has a family of seven children, ranging from three to seventeen years of age. On Wednesday morning, April 2d, Franklin Bartholomew, the next to the oldest son, broke out with measles. On Saturday evening, April 5th, three days after Franklin came down with the disease, and three days after the exposure of the entire family, I was called upon by Dr. Teller, their family physician, to go with him and inoculate the other six children and the mother, none of whom had ever had the disease. We inoculated the mother, and four of the children, leaving two boys—one thirteen and the other seventeen

years of age—without being inoculated. On April 14th, the boy seventeen years of age, and on April 16th, the one thirteen years of age broke out with the disease. It has now been five weeks since the exposure of the mother and the four children inoculated. Although there has been three successive cases of measles in the house, none of those inoculated have had any symptoms of the disease. From twenty-four to thirty-six hours after the inoculation, they all had symptoms, resembling a slight cold, with a little chilliness, catarrhal symptoms and sneezing. Beyond this they have been perfectly well from the date of the inoculation to the time of this writing, May 5th.

The inoculation does not produce a pustule and scab, like the vaccine virus, but simply a redness, around the wound, like a measle blotch. There is seldom any soreness, but usually a simple itching sensation for two or three days, extending generally from the second or third to the fifth or sixth day after the inoculation.

CASES X. to XIII. April 12th, inoculated with rye straw fungus Mrs.——, and two of her children, none of whom had ever had measles, and who had been exposed to the contagion of the disease from a case of genuine measles in the family, which broke out April 6th. On the evening of the 13th and morning of the 14th, they all had symptoms of chilliness followed by fever, catarrhal symptoms, slight cough and sneezing. The inoculating wound became red over a surface about the size of a dime, presenting the appearance of a measle blotch.

Their symptoms were so slight that the children were not kept in doors, and the mother was not prevented from attending to her ordinary duties.

On the 18th they had all quite recovered. It is now four weeks since the exposure, and no signs of measles in any of the cases inoculated.

From the inoculations as far as they have gone, in from twenty-four to seventy-two hours, the effects begin to show themselves in lassitude, chilliness, catarrhal symptoms and pains through the forehead and temples. It is highly desirable that these experiments should be extended further. For this reason we publish thus early our observations and experiments (much more limited than we could have desired, on account of the difficulty in this place of obtaining subjects who are willing to sacrifice a few hours' health to such purposes) that others in larger places, who have greater facilities in the way of hospitals, &c., for carrying out more extended series of experiments under the eye of the attending physicians, may take up the matter and aid in its further investigation.

I have not been able to distinguish thus far any difference between the eruption and attendant symptoms of genuine measles and "camp measles," or straw measles. When the disease is communicated to the human subject, however, by inhaling the spores and cells of straw fungi, the eruption appears to follow the exposure or inhalation in from twenty-four to ninety-six hours. While in exposures to the contagion of the disease, the eruption does not usually make its appearance until from eleven to fourteen days thereafter. It is stated that in inoculations made by using matter obtained

from the measle blotch, or by using the tears, blood, or salivary secretions of subjects broken out with the disease, the modified type of measles which results makes its appearance generally on the sixth or seventh day after the inoculation. In inoculating, however, with the spores and cells of straw fungi, the symptoms commence usually in about twenty-four hours; though sometimes they do not make their appearance till as late as seventy-two hours thereafter.

This matter, however, requires further investigation before fully reliable statements can be made.

To what extent inoculation with straw fungi may prove effectual in protecting the human system against the contagion of measles can only be settled by careful and extended experiments.

In Wood's Practice, under the head of *Causes* of Measles, we find the following statements, which we here quote, as they point indirectly to a possible origin of the disease somewhere in the direction of the results of these examinations.

"Though capable of being propagated by contagion, measles prevail much more at *some periods* than at others; probably under a peculiar epidemic influence. Whether this influence is sufficient of itself to produce the disease; or whether it merely acts by increasing the susceptibility to the contagious principle, may perhaps be considered uncertain. If the fact quoted by Rayer from an old author, that the disease was not known in the new world until the year 1518,[1] when it was imported from Europe, could be relied on, it would go far to prove that epidemic influence is alone insufficient; but the testimony can hardly be admitted to have much weight; *and the very frequent occurrence of the disease without any possibility of tracing the cause to personal communication, would lead to the opposite conclusion.*[2] Still there is no impossibility in the production at once by the human body and by other *unknown agencies* in *nature*, of the same identical poison, whatever that may be. The difficulty would be removed one step by admitting the vital organic character of contagions. *Cold weather*[3] appears favourable to the production of the disease, as epidemics of it are most frequent in winter. They occur, however, at all seasons. No age is exempt from the disease. It attacks the fœtus in the womb and old persons in their second childhood. Yet it is much more frequent in children than in adults. One reason of this may be a diminished susceptibility; yet a much stronger one is the fact, that most persons have the disease in early life, and can have it but once. There is a general susceptibility to measles; and there are very few who are not attacked at one or another period of their lives.

"Though, as a general rule, measles are capable of being taken but once, instances have undoubtedly occurred, as in all other contagious diseases, in which the same individual has been affected a second time."

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[1] Wheat and the other small grains were introduced into the new world about this time. Having no straw to generate the fungoid cause, they probably did not have the disease.

[2] It would, if there existed in the new world the proper material from which the cause or contagion emanates. If this be confined to the straw of our cereal grains and these were not known here previous to 1518, then there is a probability that the author, whom Rayer quotes from, may be correct.

[3] Wheat and the other small grains are generally threshed during the fall and winter, and these are the seasons when the straw is the most used, and the periods when the disease usually occurs. When it occurs at other seasons, it is highly probable it may originate from straw beds.

ART. II.—*On Cardiac Murmurs.* By AUSTIN FLINT, M.D., Prof. of the Principles and Practice of Medicine in the Bellevue Hospital Medical College, N. Y., and in the Long Island College Hospital.

THE clinical study of cardiac murmurs, within the last few years, has led to our present knowledge of the diagnosis of valvular lesions of the heart. By means of the organic murmurs it is positively ascertained that lesions exist in cases in which, without taking cognizance of the murmurs, the existence of lesions could only be guessed at. The absence of the organic murmurs, on the other hand, enables us generally to conclude with positiveness that valvular lesions do not exist. As a rule, to which there are but few exceptions, these lesions may be excluded, if there be no murmur. These are great results; but the practical auscultator of the present day need not be told that the clinical study of cardiac murmurs has led still further into the mysteries of diagnosis. Having ascertained the different murmurs which occur in connection with valvular lesions; having traced their connection, respectively, with different lesions; having shown their relations to the movements of the several portions of the heart, and to the cardiac sounds;[1] and, having explained satisfactorily the mechanism of their production, we are able to determine not only the existence or non-existence of valvular lesions, but their particular situation when they are present, and, to a certain extent, their character and consequences. The practiced auscultator, by listening to the murmurs alone, is able to tell whether lesions are situated at the mitral, or the aortic, or the pulmonic orifice, and he is able to say, in certain cases, that the valves which are to protect these orifices against a regurgitant current of blood, have been rendered by disease inadequate to their office. It is unnecessary to adduce proof of these statements; their correctness is sufficiently known to those who are conversant with physical exploration as applied to the diagnosis of affections of the heart. How strikingly do these facts exemplify the progress of practical medicine to those who, although still among the junior members of the profession, have practised before and since the recent developments in this department of our knowledge!

These remarks are introductory to the consideration of various practical points pertaining to the cardiac murmurs. And the first subject will relate to these murmurs in general—viz., *the limitations of their significance.* After having considered certain points embraced in this subject, I propose to take up various points relating to the different murmurs separately.

[1] The conventional distinction between the cardiac *sounds* and *murmurs* is to be borne in mind; the former term being limited to the normal heart-sounds with their abnormal modifications, and the latter to newly-developed or adventitious sounds, which are altogether the products of disease.

By the limitations of the significance of the murmurs, I mean the actual amount of knowledge respecting valvular lesions to be derived from this source. It is evident, from what has been stated already, that the knowledge which they convey is of very great importance, but, important as this knowledge is, it has certain limits which are not always sufficiently understood; and, as a consequence, the practitioner is liable to fall into unfortunate errors of opinion as regards the gravity of the lesions which the murmurs represent.

Prior to the clinical study of the cardiac murmurs, the existence of organic affections of the heart was recognized when, in conjunction with disturbed action of the organ, symptomatic events had taken place which belong to an advanced stage of only a certain proportion of cases. Dyspnœa, palpitation, and dropsy, were the symptoms mainly relied upon for the diagnosis. The recognized cases were then comparatively rare, and, when recognized, a speedily fatal issue was expected. This fact, together with the frequency with which cardiac lesions were revealed by post-mortem examinations in cases of sudden death, rendered the diagnosis of organic disease of the heart equivalent to a summons from the grave. The prognosis, as a matter of course, was as unfavourable as possible; the doom of the patient was either to die unexpectedly at any moment, or to endure protracted sufferings until released by death. The study of the murmurs, together with the application of other signs, enabled the practitioner to recognize organic affections at a period in the disease when otherwise they would not have been discovered. The recognized cases became more frequent. Persons were found to have cardiac lesions who presented few or no symptoms pointing obviously to disease of the heart. The ideas which had prevailed relative to the gravity of organic affections, however, naturally enough, continued to prevail. An organic murmur, consequently, had a fearful significance. It was considered as proof of disease which was not less surely destructive because earlier ascertained. Let it be said of a patient that he had a cardiac murmur denoting a valvular lesion, and his doom was pronounced; sudden death, which might occur at any time, or an early development of the distressing symptoms characteristic of cardiac disease, were to be expected, whatever might be his present condition.

So far from concealing from patients the fearful significance of cardiac murmurs, it was considered important for them to understand fully their precarious condition, in order to receive their co-operation in the measures of management which were deemed essential. These measures embraced general and local bloodletting, depletion by cathartics, sedative remedies addressed to the circulation, mercurialization, low diet, together with as much inaction of mind and body as possible. The consequences of this management were calamitous in the extreme. In fact, these measures contributed, in no small degree, to the fulfilment of the gloomy predictions impressed upon the minds of the unfortunate patients who were found to

present the auscultatory sign of valvular lesions. So long as these notions with regard to the treatment of cardiac affections prevailed, an early diagnosis, instead of being desirable, was a serious disadvantage, and truly fortunate were they who kept aloof from the stethoscope of the auscultator!

Erroneous views respecting the significance of cardiac murmurs, and also respecting the indications for treatment in cases of organic disease of the heart, are still, to a greater or less extent, prevalent. I propose now to confine myself to the former, *i. e.*, the significance of the murmurs. It is obvious that with the acquirement of means of ascertaining the existence of lesions at an early period, when, without these means, the lesions could not have been discovered, clinical experience had to take a new point of departure as regards prognosis. And experience has shown that lesions giving rise to cardiac murmurs by no means invariably denote impending danger or serious evils, and that they are not unfrequently innocuous. Several clinical observers, within the last few years, have contributed facts going to show the correctness of this statement. Of these, Dr. Stokes[1] is especially prominent. Dr. Gairdner, of Edinburgh, has lately communicated a valuable paper on this subject.[2] I have been able to gather some facts having an important bearing on the subject under consideration. Of the cases which have come under my observation, exemplifying the "limitations of the significance of cardiac murmurs," I shall select a few of the most striking.

Thirteen years ago, I attended a child, aged 11 years, with a slight rheumatic attack. Directing attention to the heart, I found a very loud mitral, regurgitant murmur, heard over the left lateral surface of the chest and on the back. The heart was enlarged, the extent and degree of dulness in the præcordia being increased, and the apex beat without the nipple. The murmur was evidently not due to an endocarditis developed during the present attack of rheumatism; the lesion giving rise to it probably originated in an obscure thoracic affection which had occurred seven years before. I was at that time less acquainted with the significance of cardiac murmurs than now, and I deemed it my duty to inform the mother of the patient of the existence of an organic affection of the heart, which would be likely to destroy life within a period not very remote. The patient is still living. She is now 24 years of age, and, although presenting a delicate appearance, a casual observer would not suspect the existence of any disease. She is subject to palpitation, to coldness of the extremities, and experiences want of breath on active exercise, but she does not consider herself an invalid, and the apprehensions caused by my communication to the mother have long since disappeared.

It is fair to presume that my opinion in this case was considered as a mistake. It was, indeed, an error of judgment as regards the prognosis, but the diagnosis was correct; the loud bellows murmur is still there, and

[1] Diseases of the Heart and Aorta.

[2] Edinburgh Monthly Journal of Med. Science.

heard over the whole chest, even through the dress, and the heart is considerably enlarged. The patient, if not destroyed by some intercurrent affection, will ultimately die of cardiac disease, yet it is now twenty years since the probable commencement of the lesions giving rise to the cardiac murmur.

Nearly twenty years ago a person was examined by a medical friend with reference to an assurance on his life. My friend, finding a loud murmur, and an abnormally strong action of the heart, brought the person to me as an interesting case for examination. I failed to record the case, and am not therefore positive as regards the particular murmur present, but I think it was the mitral regurgitant. Since that examination, until recently, I have been in the habit of meeting this person often, although he has never been my patient. He has been, and still is engaged in active business. He is now about fifty years of age. He has survived his wife, and been again married within a few years.

I have selected these two cases as illustrating the duration of life and comfortable health for thirteen and twenty years after a loud organic murmur, together with enlargement of the heart, had been ascertained; in both cases life and comfortable health continuing at the present moment. I could cite, in addition, numerous cases of persons now living, and apparently well, who have had organic murmurs for several years. In making examinations of chests, supposed to be healthy, for purposes of study, I have repeatedly found a murmur, evidently organic, when no disease of the heart was suspected either before or after my examination. The following case is instructive, as showing the importance of taking into account the coexistence of functional disorder of the heart, dependent on anæmia, with organic disease.

In November, 1852, I visited, in consultation with Professor Rogers, of Louisville, a lady aged about 25. She had had repeated attacks of acute rheumatism. She had an infant several months old, which she was nursing, and she had become quite anæmic. She had begun to suffer from palpitation during the preceding summer, and her attention was attracted to a sound in the chest which she heard in the night-time. This sound was also heard by a sister with whom she slept. She described, of her own accord, the sound to be like that produced by a pair of bellows. She had never heard of cardiac bellows-murmurs, and at this time there had been no examination of the chest. Prof. Rogers had been called to the patient a short time before my visit, and detected at once the existence of organic disease.

She presented an aortic direct and a mitral regurgitant murmur, both loud; the heart was moderately enlarged, and its action violent. She was conscious of this violent action, and slight exercise or mental excitement occasioned much distress from palpitation. The urgent symptoms in the case were attributed to anæmia; weaning was at once enjoined, and chalybeate remedies, etc., advised. I met the patient a year afterwards without recognizing her. She was apparently in perfect health, and presented a blooming appearance. Her friends thought we must have been mistaken in our opinion as to the existence of organic disease of the heart. The murmurs and the signs of enlargement, however, were still there. She

continued to enjoy good health until the summer of 1856, when she suffered from uterine hemorrhage, and again became anæmic. The action of the heart became irregular, and she complained much of vertigo. Tonics, stimulants, nutritious diet and fresh air failed to remove the anæmic state, and at length she was seized with apoplexy and hemiplegia. She recovered from the apoplexy, but the hemiplegia continued, and death took place between two and three weeks after the apoplectic seizure.

The significance of organic murmurs is limited to the points of information already stated in the introductory remarks, viz., the existence of lesions, their localization, and the fact of valvular insufficiency or regurgitation. Whether the lesions involve immediate danger to life, or, on the contrary, are compatible with many years of comfortable health, the murmurs do not inform us, nor do they teach us how far existing symptoms are referable to the lesions, and how far to functional disorder induced by other morbid conditions. Neither the intensity nor the quality of sound in the murmurs furnish any criteria by which the gravity of the lesions or their innocuousness can be determined. A loud murmur is even more likely to be produced in connection with comparatively unimportant lesions than with those of a grave character, because in the former, rather than in the latter case, is the action of the heart likely to be strong, and the intensity of the murmur, other things being equal, will depend on the force with which the currents of blood are moved. Whether the murmur be soft, or rough, or musical, depends not on the amount of damage which the lesions have occasioned, but on physical circumstances alike consistent with trivial and grave affections.

It may be imagined that these assertions, although true as regards murmurs produced by the direct currents of blood, do not hold good with respect to the regurgitant murmurs. The latter, it may be said, involving as they do insufficiency of the valves, will be loud in proportion to the amount of blood which regurgitates, and, therefore, the intensity of the murmur should be a criterion of the amount of valvular insufficiency. But clinical observation disproves this surmise. A minute regurgitant stream is as likely to be intensely murmuring as a large current, perhaps even more so. Here, too, the loudness of the sound will depend, in a great measure, on the power of the heart's action. To this point I shall recur when I come to consider the different murmurs separately.

The practical injunction to be enforced in connection with the limitations of the significance of the cardiac murmurs is, that we are not to judge of the magnitude of valvular lesions, of the amount of danger on the one hand, or of the absence of danger on the other hand, by the characters belonging to the murmurs. The physician who undertakes to interrogate the heart by auscultation is not to decide that the condition of his patient is alarming, simply because he finds a murmur which he satisfies himself is dependent on an organic lesion of some kind. The lesion may be at that

time, and perhaps ever afterwards, innocuous; the evils arising from cardiac affections may be remote, and so far from plunging the patient into despair by the announcement of the fact that he has an incurable disease of heart, there may be just grounds for holding out expectations of life and comfortable health for an indefinite period. Neither does it necessarily alter the case when more than one murmur is discovered; the existence of several murmurs by no means excludes the possibility of similar encouragement. We are to look to other sources of information than the murmurs in forming an opinion respecting the gravity of the affection. What are the sources of information on which our opinion is to be based? It does not fall within the scope of this essay to consider at length the points involved in the answer to this inquiry. I shall answer it in a few words.

The heart-sounds furnish means of determining whether the lesions are of a nature to affect materially the function of the valves. I must here pass by this useful and beautiful application of auscultation with a simple allusion to it, referring the reader elsewhere for a full exposition of the subject.[1] I shall, however, return to the subject presently in considering the murmurs individually. Means requiring less proficiency in physical exploration relate to enlargement of the heart. It is not a difficult problem to determine whether the heart be or be not enlarged, and it is easy to determine the degree of enlargement. Now, in general, if valvular lesions have not led to enlargement of the heart, they are not immediately dangerous, and the danger is more or less remote. Here is a criterion of great importance in estimating the gravity, on the one hand, or the present innocuousness on the other hand, of lesions giving rise to murmurs. So long as the heart be not enlarged, the lesions cannot have occasioned to much extent those disturbances which arise from contraction or patency of the orifices. The murmurs, in themselves, give no information respecting the amount of obstruction from contracted orifices, or of regurgitation from valvular insufficiency. Let this fact be constantly borne in mind. But obstruction and regurgitation singly or combined, inevitably lead to enlargement of the heart; hence the latter becomes evidence of the former. The degree of enlargement is, in general, a guide to the extent and duration of the disturbances occasioned by contracted and patescent orifices. As a rule, if the heart be slightly or moderately enlarged, the immediate danger from the lesions which may give rise to one or more loud murmurs is not great.

The truth is, the evils and danger arising from valvular lesions, for the most part, are not dependent directly on these lesions, but on the enlargement of the heart resulting from the lesions. We may go a step further than this and say that, ordinarily, serious consequences of valvular lesions

[1] Clinical Study of the Heart-sounds in Health and Disease, Prize Essay, Trans. Amer. Med. Association. 1859.

do not follow until the heart becomes weakened either by dilatation or by degenerative changes of tissue. So long as the enlargement be due mainly to hypertrophy of the muscular walls, the patient is comparatively safe. Hypertrophy is a compensatory provision, the augmented power of the heart's action enabling the organ to carry on the circulation in spite of the disturbance due to obstruction and regurgitation. Happily, in most cases, hypertrophy is the first effect of valvular lesions, and, for a time, it keeps pace with the progress of the latter. Dilatation, which weakens the heart's action, is an effect consecutive to hypertrophy, and, as a rule, it is not until the dilatation predominates that distressing and dangerous evils are manifested.

The practical bearing of these views respecting hypertrophy and dilatation, on the management of organic affections of the heart, is obvious. They are inconsistent with the employment of measures to prevent or diminish hypertrophy; on the contrary, they point to the importance of an opposite end of management, viz., to encourage hypertrophy in preference to dilatation, and to maintain the vigour of the heart's action. It does not fall within the scope of this essay to consider therapeutical applications, and I must content myself with this passing notice of an immensely important reform in the management of organic affections of the heart.

Returning to the means of determining the gravity of valvular lesions, I repeat, they become serious, in other words, the distressing and dangerous symptomatic events are to be expected, in proportion as hypertrophy merges into dilatation, or as weakness of the organ may be induced by structural degeneration or other causes. In connection, then, with murmurs, we are to determine the condition of the heart as respects the points just mentioned, in order to estimate properly the gravity of the lesions which the murmurs represent. In leaving this subject, viz., the limited significance of the cardiac murmurs, I will give a case which is a type of a class of cases not unfrequently coming under observation.

In the spring of 1860, I was consulted by a medical gentleman from a distant State, who furnished me with the following written statement of his case:—

"About a year ago I went to the city of —— to place myself under the care of Dr. ——, for a trifling surgical difficulty with which I had been annoyed for a long time. At long intervals previous to that time I had had severe pains in the left breast about the cardiac region, but at no time from any constant pain. I thought the pain was of a neuralgic character. While at —— I thought I would have my lungs examined, as some members of my family had been consumptive. I went to Dr. —— and to Dr. ——, both of whom pronounced my lungs sound, but said that my heart was affected. I came home much depressed by their opinion, and suffered so much from mental anxiety that in the course of a month or two I determined to go back and consult another medical gentleman, Dr. ——. He told me there was some roughness about the sounds of the heart but no serious organic disease. I was much relieved by this opinion, and clung to the belief that the pains were of a neuralgic character.[1] Previous to my

[1] Doubtless they were so.

going to —— I had all my life taken a good deal of out-door exercise, such as riding, hunting, fishing, etc., for the purpose of warding off any tendency to consumption. I have always had a frail figure and been inclined to despondency. I have suffered a great deal of anxiety, owing to family affairs and business matters. After my return from consulting Dr. —— I thought it best to give up active exercise for fear of increasing any cardiac affection that might exist. I do not think that I have had any severe pain in my chest frequently, at any time, but only at intervals and apparently occasioned by anxiety about patients, etc.

"In December last I went into the country, 13 miles, to see a patient. The weather was very cold, rainy, and windy; I returned in the night. I was suffering from toothache and smoked a cigar in order to relieve the pain. I went over to my office to write a prescription for a sick child, and on my way back I was attacked with palpitation of the heart for the first time in my life. I came into the house and lay down, when I was seized with severe rigors without chills. I had also pain in the back and afterwards fever. Since then I have been subject, at intervals, to a jarring or knocking sensation about the heart, but no palpitation of long continuance. I cannot sleep as well on my left side as formerly, as it causes an uneasy sensation with something like palpitation and some pain. I do not take much exercise, and find that I get out of breath easily. I am very sensitive to cold. The attacks of increased action of the heart are always accompanied by rigors and irritability of the bladder. On the 19th of March, I was taken with a feeling of fatigue and indigestion, followed by severe rigors together with great heat of the head and body. The circulation was rapid and accompanied by palpitation. The attack lasted nearly an hour, and I feel the effect of it to-day, March 22d. I notice, when reading a newspaper or small book, that the action of the heart causes it to vibrate. During my first attack in Dec., I had an intermittent pulse. I did not recover from that attack so as to go out for a week, and have not since been as well as before.

"Fearing that my situation was critical I have been careful of myself. I have feared to increase the affection and that I might die suddenly. But I have had fear that in taking care of the cardiac affection I shall increase a tendency to consumption. Any mental anxiety increases the action of the heart. I do not smoke nor chew tobacco, nor drink any alcoholic liquors. I have suffered much from toothache; in other respects have had generally very good health. I have never had rheumatism. I am a married man with five children. I think my cardiac affection has been getting worse since December last, and I suffer in mind dreadfully on that account, as I have a great deal to live for."

On examination of the chest, in this case, I found the apex-beat in the 5th intercostal space half an inch within a vertical line passing through the nipple. The area of superficial cardiac dulness carefully delineated on the chest, was found to be of normal extent. The left border of the heart fell within the nipple. The respiratory murmur, on a deep inspiration, was heard over the whole præcordia. The apex-beat was not abnormally strong; no other impulse was discovered, and no heaving of the præcordia.

At the first examination, the heart being but little excited, I discovered a slight murmur just to the left of the apex, heard only during the latter part of each inspiratory act. I could discover no murmur at the base. At a subsequent examination on the same day, made after dinner, the patient having drank a little wine with his dinner, the action of the heart was much greater than at the previous examination. I then discovered a well-marked systolic murmur at the apex, to the left of the apex and at the lower angle of the scapula; I also ascertained the existence of a soft systolic murmur at the base on the left side of the sternum and not on the right side. This murmur extended over the whole summit of the chest on the left side. At the summit it came evidently from the subclavian, as the

pitch differed from that of the murmur over the pulmonary artery, *i. e.*, in the 2d intercostal space on the left side.

On the next morning I made an examination while the patient was still in bed. The heart was then acting tranquilly. I discovered a feeble murmur at the apex only; this murmur was not perceived behind, and no murmur was heard at the base.

The aortic and pulmonic second sounds were normal, and so also were the mitral and tricuspid valvular elements of the first sound.

I shall quote from my record book the remarks which were appended to this case when the record was made:—

"The heart is but little if at all enlarged, and the heart sounds are normal. There exist, therefore, no lesions which at present are of serious import. The cardiac trouble which has occasioned the patient so much unhappiness and anxiety, is purely functional.

"Dr. —— (who first examined this patient) evidently discovered a murmur. His examination was not very critical, and was made after the patient had just mounted stairs at his hotel. The opinion that there was organic disease without any qualifying explanations produced a profound moral impression on the patient. The opinion of Dr. —— subsequently did something toward relieving the apprehensions of the patient; but his coming such a long distance to consult me is evidence how much his mind was ill at ease on the subject."

"The heart is not entirely free from lesions; there is slight mitral regurgitation. The murmur at the base is perhaps inorganic, or at all events it does not denote important valvular lesions, since a comparison of the aortic and pulmonic sounds shows the two to be in a normal relation to each other. The lesions in fact which exist in the case are of no immediate seriousness, and of this I assured the patient in the most positive manner."

"This case affords an illustration of the importance of discriminating between functional disorder and the effects of organic disease when there is evidence of the latter. It illustrates, also, the importance of the heart sounds and of the size of the heart in determining the gravity of lesions. The evils which may arise from the lesions (if they ever occur) are remote, and I felt warranted in assuring the patient that his condition involved no present danger, and that he might dismiss all thoughts of disease of the heart. I ordered him to live well and to resume his out-door sports. His apprehensions were entirely relieved by my assurances, and his expressions of gratification afforded evidence of what he had suffered mentally from the idea of an organic disease incapacitating him for the duties of life and rendering him liable to sudden death."

As I have said, this case is a type of a class of cases of not unfrequent occurrence. The existence of a cardiac murmur was discovered in consequence of an examination with reference to the lungs. Prior to this time no symptoms of disorder of the heart existed; the discovery of the murmur was an unfortunate circumstance for the patient; the belief that he had serious disease of heart became fixed in his mind, and doubtless contributed to the disorder which subsequently occurred. The functional disorder was slight in comparison with cases which are of daily occurrence; but the patient naturally attributed it to organic disease. The affection was in

fact altogether functional, albeit the existence of an organic murmur; this is the practical point which the case is intended to illustrate.

I propose now to consider certain practical points pertaining to the cardiac murmur separately; I shall limit my remarks mainly to the murmurs produced by the blood-currents, in the left side of the heart, viz., the *aortic direct, the aortic regurgitant,* the *mitral systolic* and the *mitral direct.* Exclusive of the *pulmonic direct* murmur I have but little practical acquaintance with murmurs emanating from the right side of the heart.

Aortic direct murmur.—The question whether a murmur be organic or inorganic has reference generally to a murmur produced by the current of blood from the left ventricle into the aorta. The aortic regurgitant murmur and a mitral murmur which is truly regurgitant are of necessity organic; they require lesions involving more or less insufficiency of the valves. The mitral direct murmur, as will be seen presently, is inorganic only as a rare exception to the rule. A practical point, then, in certain cases, is to determine whether an existing aortic direct murmur be organic, *i. e.*, dependent on lesions, or whether it be inorganic, *i. e.*, dependent on a blood-change. This point cannot always be positively settled, but when such is the case it is practically not very important that it should be settled; in other words, when a murmur exists concerning which we are at a loss to decide whether it be organic or inorganic, if it be the former, the lesion giving rise to it must be trivial, since under these circumstances the heart sounds will be found to be normal and the heart not enlarged. If in connection with an aortic direct murmur we find the aortic second sound impaired and the heart enlarged, we are warranted in considering the murmur organic. But a slight rippling of the current by roughening from an atheromatous or calcareous deposit which occasions no obstruction, and no valvular insufficiency, may yield a murmur. How are we to distinguish this from an inorganic murmur? The absence of the anæmic state, of other cardiac murmurs, of arterial murmurs, of the venous hum, and the persistency and uniformity of the murmur are the circumstances which render it probable that it is organic; while the existence of anæmia, of other cardiac murmurs, of arterial murmurs and the venous hum, together with intermittency and variableness of the murmur, render it probable that it is inorganic.

In my work on diseases of the heart, 1859, I have stated roughness of the murmur to be one of the circumstances showing it to be organic. I then believed that an inorganic murmur was never rough. The able reviewer of my work in the *Dublin Quarterly* says, with regard to this point, "We are unable to give unqualified assent to the statement that an inorganic murmur is uniformly soft." The criticism of the reviewer is just; I was mistaken in the statement as the following case will show:—

I visited in May, 1860, a female patient who presented a loud rasping murmur which had led to the suspicion of aneurism. The patient was exceedingly anæmic; there was total loss of appetite with vomiting and diarrhœa. The anæmia could not be accounted for; it belonged in the category of cases described by Addison as cases of idiopathic anæmia. I found a rough rasping murmur at the base of the heart on the right of the sternum, and a similar murmur was heard over the subclavian and carotid. On examination after death, in this case, the heart was perfectly normal, the aortic orifice, the aorta, subclavians, and carotids were free from any morbid change, and the lungs were healthy. The murmur was evidently due to a blood change.

The discrimination of an aortic direct from a pulmonic direct murmur is a point of interest. If the normal situation of the aortic and pulmonic artery in relation to the walls of the chest be preserved, an aortic direct murmur has its maximum of intensity and may be limited to the point where the aorta is nearest the surface, viz., the second intercostal space on the right side close to the sternum. But the normal relation of the vessels to the thoracic walls is not infrequently changed when the heart becomes enlarged, or as a consequence of past or present pulmonary disease, and hence this murmur may be loudest or limited to the base on the left side of the sternum. The situation of the murmur or of its maximum, therefore, is not always reliable in the discrimination. A pulmonic direct murmur has its maximum or is limited to the second or third intercostal spaces on the *left* side close to the sternum, the artery being at these points nearest the surface, but, as just stated, an aortic direct murmur may be found to be loudest in this situation. If the heart be not enlarged or displaced by pressure from below the diaphragm, the chest not depressed, and the lungs are free from disease, the fact that a murmur has its maximum at or is limited to the right side of the sternum, is evidence of its being aortic rather than pulmonic, and *per contra*, the fact of a murmur having its maximum at or being limited to the left side of the sternum, is evidence of its being pulmonic rather than aortic. But the propagation of the murmur into the carotid is the most important circumstance in this discrimination. An aortic direct murmur, unless it be quite weak, is generally propagated into the carotid. A pulmonic direct murmur of course cannot be. Here attention to the pitch and quality of sound is called into requisition. It is to be determined that a murmur heard over the carotid is propagated from the aorta not produced within the carotid. How is this to be determined? Very easily in most cases, by a simple comparison of the murmur as heard over the carotid and at the aortic orifice. If the murmur in the neck be a propagated murmur it will differ from that at the base of the heart chiefly as regards intensity; the pitch and quality will not be materially changed. If it be rough or soft at the base of the heart, it will be the same in the neck; if the pitch be high or low at the base of the heart, it will be the same in the neck. On the

other hand, a murmur produced within the carotid, will be likely, in the great majority of cases to differ in quality and pitch from a coexisting murmur at the aortic orifice.

In accordance with what has been stated with reference to the limitations of the significance of organic murmurs in general, an aortic direct murmur, when undoubtedly organic, alone affords little or no information respecting the nature and extent of the lesions which give rise to it. A comparison of the aortic with the pulmonic second sound of the heart enables us frequently to form an opinion as regards the amount of damage which the aortic valve may have sustained. The aortic second sound, in health, as heard in the right second intercostal space near the sternum, is more intense, and has a more marked valvular quality, than the pulmonic second sound as heard in a corresponding situation on the left side. Now, it is often easy to determine whether the intensity of the aortic second sound is diminished and its valvular quality impaired; and in proportion as this sound is abnormally altered in these respects, we may infer that the aortic valve is damaged. It is hardly necessary to say that, in order for this comparison to warrant the inference just stated, pulmonary disease must be excluded. A tuberculous deposit, for example, on the left side, may, by conduction, render the pulmonic apparently more intense than the aortic sound, the latter retaining its normal intensity; the same will occur from shrinking of the upper lobe of the left lung so as to bring the pulmonic artery into contact with the thoracic walls. Under the latter circumstances the pulsation of the pulmonic artery may sometimes be distinctly felt in the second left intercostal space near the sternum. I have met with two cases during the past winter in which the pulsation of the pulmonic artery was so strong as to suggest the idea of aneurism; in both cases the patients were affected with tuberculous disease of the left lung. Alteration of the normal relation of the aorta and pulmonic artery due to enlargement of the heart, or to any of the causes already mentioned, will of course preclude a comparison of the two sounds.

With reference to the value of a comparison of the aortic and pulmonic second sound in estimating the amount of aortic lesions, the able reviewer in the *Dublin Quarterly*, to whom I have already referred, and for whose valuable criticisms I beg to avail myself of this opportunity of expressing my sincere thanks, remarks as follows:—

"It is observed, to our great wonder, that if the aortic second sound retain its normal intensity and purity, it shows that the aortic valve is competent to fulfil its function, *a fact which warrants the exclusion of lesions affecting it sufficiently to give rise to obstruction.*" He adds, "Surely Dr. Flint must have become clinically cognizant of the fact that there is not unfrequently serious contraction of the aortic orifice producing marked obstruction and hypertrophy of the left ventricle, the aortic second sound remaining intact."

This criticism is not altogether just. I state that the normal intensity and purity of the aortic second sound warrant the exclusion of lesions affecting

it, *i. e.*, the valve, sufficiently to give rise to obstruction. I do not say that contraction of the aortic orifice may not occur without involving the aortic valve, and, in such a case, the aortic second sound may remain intact. In fact, I imply this when I proceed to say, "In a large proportion of the cases of obstructive lesions of the aortic orifice, the valve is involved sufficiently to compromise, to a greater or less extent, its function and impair the intensity of the aortic second sound." This language is equivalent to admitting that there is a small proportion of cases of obstructive lesions of the aortic orifice, in which the valve is *not* involved sufficiently to compromise its function and impair the intensity of the aortic second sound. These exceptional cases are extremely rare. Surely the able reviewer will admit that, in the great majority of cases, the valve is involved so as to impair its function to a greater or less extent.

I have lately been interested in a nice point of observation connected with the murmur under consideration, viz., the concurrence of two aortic direct murmurs, one produced at the aortic orifice and another within the aorta just above the orifice. One of the murmurs may be organic and the other inorganic, or both murmurs may be organic. At the present moment I have under observation three cases of endocarditis with rheumatism, each presenting a high pitched basic murmur when the stethoscope is placed over the sternum and a little to the right of the median line, the murmur limited to a circumscribed space, and just above this point, in the right second intercostal space, is another murmur differing from the former notably in pitch, being quite low. In one of these cases there is still another murmur in the pulmonic artery. The high pitched murmur just below the second intercostal space, as I infer from the situation to which it is limited, is a murmur produced at the aortic orifice; and the low pitched murmur just above, as I infer, also, from the situation to which it is limited, is an aortic murmur produced within the artery above the aortic orifice. I infer that there are two murmurs from the notable difference in pitch, it being by no means probable that a single sound would be so much altered within the area in which the two murmurs are heard, this area not being larger than a half dollar. That an aortic murmur is sometimes produced at the orifice and sometimes within the artery above the orifice, in different cases, is certain, but I am not aware that the production of a murmur in each situation, at the same time, in the same case, and the discrimination of the two by means of the character of the sound, have been pointed out.

Aortic regurgitant murmur.—This murmur need never, as a matter of course, be confounded with the systolic murmurs, viz., the aortic direct, and mitral regurgitant, the latter occurring with the first, and the former with the second sound of the heart. In general, too, there is no difficulty in distinguishing the aortic regurgitant, from the mitral direct murmur. The former occurs with and follows the second sound, the latter precedes the

first sound. The one is diastolic, the other is pre-systolic. This is a distinction, nice, it is true, but easily appreciable in practice, to which I shall recur under the heading of the mitral direct murmur.

The situation of the murmur is also distinctive. It is best heard at, and below the base of the heart. Usually it is best heard below the base to the left of the median line on a level with the third or fourth ribs. This is doubted by the reviewer in the *Dublin Quarterly*, to whom I have referred, but as the statement is based on a pretty large number of recorded observations, I must consider it as correct. It is not uncommon to hear this murmur distinctly, and even loudly, over the apex; it may be diffused over the whole præcordia and even propagated beyond this region.

An aortic murmur with the second sound of the heart, propagated below the base of the heart, necessarily implies regurgitation, in other words there must be insufficiency of the aortic valvular segments. But it is always to be borne in mind that no inference can be drawn from the intensity or character of the murmur, respecting the amount of insufficiency and consequent regurgitation. An extremely small regurgitant stream may give rise to a loud murmur, while a feeble murmur may accompany a large regurgitant current, as the rippling brook is noisy while the deep broad river flows silently. In a case recently under observation, there existed a loud aortic regurgitant murmur, and on examination after death the aortic segments were so slightly impaired that, on cursory inspection, they might have been considered as normal. Weakening or extinction of the aortic second sound of the heart are points of importance as showing frequently the extent to which the function of the aortic valve is impaired. Comparison with the pulmonic sound enables us to judge whether the aortic sound be impaired, provided the pulmonic sound be not abnormally intensified as a result of coexisting mitral lesions. It is important to recollect that when aortic and mitral lesions coexist, the intensity of the pulmonic sound cannot be taken as a criterion for judging whether the aortic sound be, or be not weakened. This remark is equally applicable to the comparison in cases in which an aortic direct murmur is present. It is needless to say that in comparing the aortic and pulmonic sound in connection with an aortic regurgitant, as with an aortic direct murmur, pulmonary disease is to be excluded, *i. e.*, solidification or shrinking of the left lung will, as already stated, render the pulmonic sound relatively more intense than the aortic, irrespective of, on the one hand, any actual increase of the intensity of that sound, or, on the other hand, of any weakening of the aortic sound. It is also to be stated here, as heretofore, that an alteration of the situation of the aorta and pulmonary artery as regards the thoracic walls, due to enlargement of the heart, or other causes, will preclude a comparison of the two sounds with reference either to intensification of the pulmonic, or weakening of the aortic sound.

Mitral systolic murmur.—I use the phrase mitral *systolic*, instead of that more commonly used, viz., mitral *regurgitant* murmur, as applied to any murmur produced at the mitral orifice and accompanying the first sound of the heart. If the latter term be applied to any systolic murmur emanating from the mitral orifice, we fall into the solecism of calling a murmur regurgitant in cases in which there is no regurgitation. A mitral murmur may be produced by mere roughness of the valvular curtains when there is no insufficiency of the valve. In this case the murmur cannot be correctly said to be regurgitant. A mitral systolic murmur, thus, may or may not be a regurgitant murmur, and, to express this important distinction, we may say that a mitral systolic murmur exists with or without regurgitation. The question at once arises, how are we to determine whether a mitral systolic murmur be regurgitant or non-regurgitant? This point claims consideration.

A mitral systolic murmur, as is well known, generally has its maximum of intensity at, and the murmuring may be limited to, the situation of the apex-beat, or to the point where the intensity of the first sound of the heart is greatest. The murmur may be diffused, in the first place, within this point over the body of the heart, and, in the second place, without the apex over the left lateral surface of the chest and on the back. I have been led to believe that when the murmur is diffused over the left lateral surface and more or less over the back, it always denotes regurgitation, and that when the murmur is not propagated much without the apex, although it may be more or less diffused over the body of the heart, it may be produced within the ventricle and not by a regurgitant current. In the latter case I have distinguished the murmur as an intra-ventricular murmur, and not considered it as affording any evidence of insufficiency of the mitral valve. It is this intra-ventricular, or mitral systolic non-regurgitant murmur, which generally exists in rheumatic endocarditis. The importance of the point involved is obvious, for a murmur emanating from the mitral orifice without valvular insufficiency or regurgitation, denotes lesions of little immediate consequence, and they may be innocuous, not only for the present but for the future.

The practical rule just stated, I believe, generally holds good; but there may be exceptions. The following is perhaps an exceptional instance: a case was recently under my observation in Bellevue Hospital, in which acute rheumatism was complicated with endocarditis, pericarditis, and pleurisy, with considerable effusion, affecting the left side. This patient presented, on admission, a loud pericardial friction sound diffused over the whole præcordia, and a loud mitral systolic murmur. The latter had its maximum of intensity at the apex, but was diffused over the left lateral surface of the chest and heard on the back. After the lapse of about a week the friction sound disappeared; but before the disappearance of the friction sound, the endocardial murmur had gradually diminished and disappeared.

The pleuritic effusion also disappeared, and evidence was afforded in this case of pericardial adhesions by the immobility of the apex-beat when the body of the patient was placed in different positions. The disappearance of an endocardial murmur developed by rheumatic endocarditis, so far as my observation goes, is rare, although I have met with other examples. I suppose that endocarditis does not involve actual regurgitation save as a remote consequence of lesions to which the endocarditis may give rise. I may be mistaken in this supposition, but, assuming that I am not, here was an instance in which an intra-ventricular or non-regurgitant mitral systolic murmur was propagated entirely around the chest.

With reference to determining the existence of either regurgitation or obstruction, or both, resulting from mitral lesions, a comparison of the aortic and pulmonic second sound, forms a beautiful and useful application of auscultation. Obstructive and regurgitant lesions, situated at the mitral orifice, involving an obstacle to the free passage of blood through the pulmonary circuit, give rise, as is well known, to hypertrophy of the right ventricle. In this way they lead to intensification of the pulmonic second sound of the heart. This effect is due, in part, to the augmented power of the contractions of the right ventricle, and, in part, to the resistance to the passage of blood through the lungs, both continuing to increase the dilatation of the pulmonary artery by the pulmonic direct current, and the consequent recoil of the arterial coats by which the pulmonic valvular segments are expanded, and the pulmonic second sound produced. But the morbid disparity between the aortic and pulmonic second sound is due, not alone to the intensification of the latter in the manner just stated. The aortic second sound is weakened in proportion to the amount of blood which fails to pass into the aorta with the ventricular systole, in consequence of the mitral obstruction or regurgitation. It is obvious that the aortic direct current will be lessened by the amount of blood which, in consequence of valvular insufficiency, flows backward into the left auricle after the ventricle contracts, and by the amount of difficulty which exists in the free passage of blood from the auricle into the ventricle in consequence of a contracted orifice. It is also obvious that, other things being equal, the intensity of the aortic second sound will be greater or less according to the quantity of blood propelled into the aorta by the ventricular systole. Thus it is clear how mitral obstruction and regurgitation lead to weakening of the aortic sound, as well as to intensification of the pulmonic sound, and both effects are abundantly attested by clinical observation.

The degree of weakening of the aortic and of intensification of the pulmonic sound will be proportionate to the amount of mitral regurgitation or obstruction, or both. We have then, in this application of auscultation, a means of obtaining information respecting the extent or gravity of mitral lesions. And, in a negative point of view, this application is important, viz., as a means of determining that lesions which give rise to a

murmur are not serious; in other words, of determining that they do not involve much, if any, obstruction or regurgitation. As enabling us to exclude obstructive or regurgitant lesions in certain of the cases in which mitral murmurs exist, a comparison of the aortic and pulmonic sound is of great practical value. But the circumstances which may stand in the way of this application of auscultation are to be borne in mind. The two sounds cannot be compared with reference to mitral, more than with reference to aortic lesions, if there be coexisting pulmonary disease, nor whenever the normal relation of the aorta and pulmonary artery to the thoracic walls is altered by either past or present disease of lungs, by deformity of the chest, or any other cause. It is also to be recollected that mere enlargement of the heart may disturb the normal relation of these vessels to the walls of the chest. This application, moreover, cannot be made when mitral and aortic lesions coexist. Under the latter circumstances it is, of course, difficult or impossible to determine how far an existing disparity between the aortic and pulmonic sound is due to the aortic, and how far to the mitral lesions.

Another important point pertaining to a mitral systolic murmur is, its occurrence without any appreciable lesions. A truly mitral regurgitant murmur doubtless always involves lesions of some kind, for it is hardly probable that the papillary muscles, as has been supposed, may become spasmodically affected and thus give rise to insufficiency or regurgitation as a temporary functional disorder. But it is undoubtedly true that a systolic murmur either limited to, or having its maximum of intensity near the apex, has been repeatedly observed in cases in which mitral lesions were not apparent after death. Dr. Bristowe in a paper contained in the *Brit. and For. Med. Chir. Review*, for July, 1861, details six cases of this description. Dr. Barlow, in an article in *Guy's Hospital Reports*, vol. v., 1859, states that a mitral murmur may occur (for what reason he does not state) in long-continued capillary bronchitis. I have met with some instances in which a systolic murmur, supposed to be mitral, existed, and no mitral lesions were found after death.

CASE 1.[1] In the winter of 1859–60, I saw a female patient in the Charity Hospital, New Orleans, in the service of my colleague, Prof. Brickell, affected with capillary bronchitis. After several days there was improvement as regards the pulmonary symptoms, and then, for the first time, a systolic cardiac murmur was discovered. The murmur was loudest at the epigastrium, but heard over the site of the apex, and extended to, but not above the base of the heart. The patient subsequently died. On examination after death the lungs were emphysematous; there were no valvular lesions, all the valves appearing to be sound. The foramen ovale was closed. There were no clots. The right ventricle was distended with liquid blood. The walls of the heart were of normal thickness. The valves and orifices were not measured, nor was the water test of valvular sufficiency employed.

[1] Private Records, vol. xi. p. 36.

In recording this case I have commented on the murmur as follows: "What could have caused the loud systolic murmur? I cannot say unless it was due to distension of the right ventricle and tricuspid regurgitation."

In support of the supposition that the murmur was tricuspid, not mitral, it is to be noted that the greatest intensity was at the epigastrium. It was, however, considered to be a mitral systolic murmur during life.

CASE 2.[1] During the winter of 1860–61, a patient was under my observation in the Charity Hospital, New Orleans, for four months, affected with albuminuria and general dropsy. During all this time there was a mitral systolic murmur heard at the apex and over the body of the heart, and not propagated without the apex. It was regarded as a mitral systolic, non-regurgitant or intra-ventricular murmur, and as such pointed out to several private classes in auscultation. The patient died by asthenia, and was found to have fatty kidneys and cirrhosis of the liver. On examination of the heart, *post mortem*, nothing abnormal was found except some enlargement, the organ weighing 12 oz., and a little separation of the marginal extremity of two of the aortic segments. The mitral valve appeared to be perfectly normal. I expected to find some roughening of the mitral valve but no insufficiency; there was, however, no atheromatous, calcareous or other deposit, and the valve seemed to be sufficient. There was no aortic, nor pulmonic murmur in this case, a fact which excludes the supposition that the existing murmur was due to the condition of the blood.

CASE 3.[2] During the winter of 1860–61, a patient was under my observation in the Charity Hospital, New Orleans, for about six weeks, affected with chronic bronchitis and emphysema of lungs. He presented habitual dyspnœa which was at times excessive, persisting lividity and anasarca. The heart was evidently somewhat enlarged. There was a loud rough systolic murmur, having its maximum of intensity at the apex propagated without the apex (the record does not state how far), and over the body of the heart. On examination after death the volume of the heart was not much increased, and its weight was 13 oz. The left ventricle was not dilated and the left auricle was small. The walls of the left ventricle did not exceed half an inch in thickness, and the appearance of the muscular tissue was healthy. The mitral valve was perfectly normal. The orifice was not enlarged, and the valve must have been sufficient. No lesion at the aortic orifice. The right cavities were much dilated. They were twice as large as the left cavities. The walls of the right ventricle were much thickened, the thickness falling but little short of that of the left ventricle. No lesion of the pulmonic orifice. The tricuspid valve was normal. The orifice was very large, admitting the extremities of all the fingers. I have appended to the record of this case the following comment: "Whence the murmur supposed to be a mitral regurgitant? I suspect it was a tricuspid regurgitant."

Dr. Bristowe, in the article already referred to, discusses several conditions which have been supposed to give rise to the murmur in cases like those which have just been given, viz., clots in the ventricular cavity, spasm of the papillary muscles, and enlargement of the auricular orifice so as to

[1] Private Records, vol. xi. p. 243.
[2] Hospital Records, vol. xv. p. 423.

render the valve insufficient. His own opinion is that the murmur is due to a "disproportion between the size of the ventricular cavity and the length of the chordæ tendinæ and musculi papillares." This disproportion he attributes to dilatation of the cavity of the ventricle. He also accepts to some extent an explanation offered by Dr. Hare, viz., that the murmur may be due to a "lateral displacement of the origins of the musculi papillares in consequence of the rounded form which dilatation imparts to the heart."

These several explanations may each be applicable to certain cases, but none of them, apparently, to the cases which I have given. Clots in the left ventricular cavity were not present in either of the cases; the murmur continued too long and too persistently to be due to spasm; the mitral orifice was not dilated, and the enlargement of the heart was not sufficient to occasion a notable disproportion between the length of the tendinous cords and papillary muscles, and the ventricular cavity. I am disposed to think that in each of the three cases the murmur was erroneously considered to be mitral; that it was a tricuspid regurgitant murmur. As I have already said, I have but little practical knowledge of tricuspid murmurs. I have met with two instances in which murmur was connected with well-marked tricuspid lesions as verified by examination after death. In both these cases the murmur was heard over the body of the heart, within the superficial cardiac region. I suspect that a tricuspid regurgitant murmur is not so rare as is generally supposed, and that not very infrequently it is considered to be mitral. This opinion is expressed by Dr. Gairdner in an interesting article on cardiac murmurs in the *Edinburgh Med. Monthly*, Nov. 1861. According to this able clinical observer, a tricuspid systolic murmur is heard over the right ventricle where it is uncovered of lung, being but slightly audible above the third rib; and, if the heart be much enlarged, it may be heard louder towards the xiphoid cartilage. A collection of clinical facts respecting the frequency of tricuspid murmurs, the physical conditions giving rise to them, and the means of discriminating them from mitral murmurs, is an important desideratum.

Mitral direct murmur.—This murmur is not recognized by many auscultators, and its existence is denied by some. It is generally confounded with a mitral systolic murmur. For many years after I had begun to devote special attention to cardiac affections, I committed this mistake, and I was sometimes puzzled to account for a supposed mitral systolic murmur rough at its beginning and soft at its ending. In my records of some cases before I had learned to separate the mitral direct from a mitral regurgitant, I have described the latter as presenting the variation just stated, the fact being that the two murmurs were present, the one rough and the other soft. It is only within the last few years that I have discriminated these two murmurs, but during this time my field of clinical observation has

been so extensive that I have had abundant opportunities to make the discrimination. With regard to the frequency of the mitral direct murmur, it is by no means so rare as is generally supposed, and as I had thought some years ago. At one time during the past winter, in Bellevue Hospital, I knew of six examples of it, and several also at the Blackwell's Island Hospital. When the auscultator has learned to distinguish it, he will not be long in finding it if he be in the way of seeing a moderate number of cases of disease of the heart. From what has now been said, it is obvious that an important point pertaining to this murmur is, its discrimination from other murmurs. This point will first claim consideration.

In order to comprehend this murmur, it is essential to understand clearly when the mitral direct current of blood takes place. The opportunity of observing the movements of the heart exposed to view in a living animal, conduces greatly to a clear understanding of this point. The mitral direct current is produced by the contraction of the auricles; now, when do the auricles contract? When the movements of the heart are observed, it is seen that the contraction of the auricles immediately precedes the contraction of the ventricles. So close is the connection between the contraction of the auricles and the contraction of the ventricles, that the former appears to merge into the latter; there is no appreciable interval between the two, but the successive movements, although distinct, appear to be continuous. Moreover, it is evident to the eye, and to the touch, that the contractions of the auricles are not so feeble as some seem to suppose. The mitral direct current of blood, therefore, occurs just before the ventricular systole; it continues up to the ventricular systole, and must, of course, instantly cease when the ventricles contract. The contraction of the ventricles causing the first sound of the heart, it follows that the mitral direct current caused by the auricular contractions must take place just before the first sound; that it must continue to the first sound, and that it cannot continue an instant after the first sound.

The mitral direct murmur is produced by the mitral direct current of blood forced by the auricular contractions through a contracted or roughened mitral orifice. Hence, the facts just stated with regard to the current, apply to the murmur. The murmur occurs just before the ventricular systole or the first sound of the heart; it continues up to the occurrence of the first sound, and instantly ceases when the first sound is heard. It is not strictly correct to call this a diastolic murmur; it does not accompany the second or diastolic sound of the heart. The aortic regurgitant is the only true diastolic murmur. The mitral direct is a pre-systolic murmur; this name expresses its proper relation to the heart sounds, and it is the only murmur which does occur in that particular relation. The time of its occurrence as just explained, and as expressed by the term pre-systolic, is sufficient for its easy recognition when once it is fully comprehended. Although, when this murmur is fully comprehended, and has been repeatedly

verified, it is more readily recognized than either of the other murmurs, there is often at first considerable difficulty in determining its existence. Let me endeavour to point out the way in which it may be ascertained. I have already said that by those who overlook this murmur it is generally confounded with the mitral systolic or regurgitant murmur. This is in consequence of its close connection with the first sound, and because it is heard at and near the apex of the heart. Now it is evident that a mitral systolic murmur cannot commence before the ventricular systole. It is equally evident that the ventricular systole and the first sound of the heart are synchronous. It is, therefore, an absurdity to suppose that a mitral systolic or regurgitant murmur can be pre-systolic in the time of its occurrence. This murmur must necessarily accompany and follow the first sound of the heart, as clinical observation has established. We have, then, only to determine that a murmur is pre-systolic, and that it does not accompany the second sound of the heart (*i. e.*, there is an appreciable interval of time between the second sound and the murmur), to recognize it as a mitral direct murmur. Generally it is sufficiently easy, after a little practice, to perceive that the murmur precedes the sound, but, if there be difficulty or doubt, there is a ready mode of rendering it apparent; this is by placing the finger on the carotid pulse. The carotid pulse is synchronous with the first sound of the heart, or, at least, so nearly synchronous, that there is no appreciable interval of time between them. Placing, then, the finger on the carotid and listening to the murmur at the apex, the murmur is found to occur before the arterial impulse and to cease instantly when the latter is felt.

The mitral direct murmur is to be discriminated from an aortic regurgitant murmur. These two murmurs may be confounded at first, but after a little practice the discrimination is easy. The aortic regurgitant murmur accompanies and follows the second sound of the heart. The mitral direct commences after the second sound. Generally there is a distinctly appreciable interval of time between the second sound and the commencement of the murmur. The aortic regurgitant murmur may be prolonged nearly or quite through the long pause up to the first sound; but the intensity of the murmur diminishes with the prolongation, the murmur being insensibly lost before or when the first sound occurs. The mitral direct murmur, on the contrary, always continues up to the first sound, and instead of losing any of its intensity, it becomes more intense, and appears to be abruptly arrested, in its greatest intensity, when the first sound occurs. This is a striking characteristic. The difference in the situation in which two murmurs respectively are heard with their maximum of intensity, is another point in the discrimination. The aortic regurgitant murmur is generally heard at the base of the heart, and is heard loudest a little below the base near the left margin of the sternum on a level with the third intercostal space. The mitral direct murmur is heard loudest at or a little within the

apex; is generally confined within a circumscribed space, not propagated much without the apex and rarely to the base of the heart.

The quality of the mitral direct murmur is, in many cases, characteristic. In my work on diseases of the heart I have said that this murmur is generally soft. My experience since that work was written has shown me that this statement is incorrect. The murmur is oftener rough than soft. The roughness is often peculiar. It is a *blubbering* sound, resembling that produced by throwing the lips or the tongue into vibration with the breath in expiration. I suppose that the murmur is caused, in these cases, by the vibration of the mitral curtains, and that the vibration of the lips or tongue by the breath represents the mechanism of the murmur as well as imitates the character of the sound. At one time I supposed this blubbering murmur denoted a particular lesion, viz., adhesion of the mitral curtains at their sides, forming that species of mitral contraction known as the *button-hole slit;* but I have found this variety of murmur to occur without that lesion, and, in fact, as will be seen presently, when no mitral lesion whatever exists.

A mitral direct murmur may, or may not, be associated with a mitral systolic murmur. Without having analyzed the numerous examples which I have recorded during the last few years, I should say that, while the mitral systolic murmur is much more frequent in its occurrence than the mitral direct, the former, indeed, being the most common of all the murmurs, the mitral direct is observed quite as often without, as with the mitral systolic. But the two frequently coexist, and then the demonstration of the existence of the mitral direct murmur may be made more striking than when it exists alone, provided, as is usually the case, this murmur be rough and the mitral systolic murmur be soft. Listening at or near the apex in a case presenting a blubbering mitral direct and a soft mitral systolic murmur, the former, of course, precedes the latter, and between the two occurs the first sound of the heart, the apex-beat and the carotid pulse. The first sound, the apex beat or the carotid pulse will be found to mark the abrupt ending of the mitral direct, and the beginning of the mitral systolic murmur. The different relations of the two murmurs to the first sound are distinctly perceived in such a case if the observer be prepared to perceive them by a clear comprehension of the subject. And when once the discrimination between the two murmurs has been fairly made, it becomes sufficiently easy; indeed, the mitral direct murmur is then more readily recognized than either of the other murmurs.

The existence of a mitral direct murmur has been theoretically denied on the ground that the auricular contractions are too weak to propel the current of blood with sufficient force to give rise to a sound. It is undoubtedly true that, other things being equal, the intensity of a murmur is proportionate to the force of the current, and clinical observation shows that sometimes a murmur is not appreciable when the heart is acting feebly,

but becomes distinct when the power of the heart's action is from any cause increased. But murmurs do by no means always require for the production a powerful action of the heart; on the contrary, loud murmurs are often found when the heart is acting very feebly. For example, I have reported a case in which an aortic direct and an aortic regurgitant murmur were well marked in a patient an hour before death, the patient dying from paralysis of the heart due to distension of the left ventricle. Venous murmurs in the neck are often notably loud when, assuredly, the force of the current of blood in these veins is vastly less than the current from the auricles to the ventricles. The feebleness of the current in this instance is shown by the slight pressure requisite to interrupt it and arrest the murmur. It requires but little force of the expiratory current of air to throw the lips into vibration so as to produce a loud sound. Moreover, one has only to see and feel the contractions of the auricle, when the heart is exposed in a living animal (the heart's action being much weakened under these circumstances) to be convinced that the power of these contractions is not so small as some seem to imagine; the blood is driven into the ventricles with considerable force. It is hardly necessary to say, however, that *à priori* reasoning with regard to the existence or non-existence of physical signs is not admissible. Their existence is a matter to be determined by direct observation. Clinical observation shows that a murmur does occur at the precise time when the mitral direct current takes place as shown by observation of the movements of the heart exposed to view in a living animal. And clinical observation shows that this murmur is not always feeble, but, on the contrary, is not infrequently notably loud.

So much for the reality of the mitral direct murmur and the means of discriminating it from other murmurs. It remains to consider another important practical point, viz., the pathological import of this murmur. As already stated, it is developed in connection with a contracted mitral orifice, and, so far as my experience goes, especially in connection with contraction caused by adherence of the mitral curtains, forming the *buttonhole slit;* the murmur, then, being due, not to the passage of blood over a roughened surface, but to the vibration of the curtains. And the sound, as thus produced, is peculiar, resembling the sound which may be produced, in an analogous manner, by causing the lips to vibrate with an expiratory puff. The murmur, however, may be produced by the flowing of the current of blood over a roughened surface, without contraction of the aperture. This is undoubtedly rare. As a rule, the force of the mitral direct current is not sufficient to develop a murmur unless there be mitral contraction. Is this murmur ever produced without any mitral lesions? One would *à priori* suppose the answer to this question to be in the negative. Clinical observation, however, shows that the question is to be answered in the affirmative. I have met with two cases in which a well-marked mitral direct murmur existed, and after death in one of the cases no mitral lesions were

found; in the other case the lesion was insignificant. I will proceed to give an account of these cases, and then endeavor to explain the occurrence of the murmur.

CASE 1.[1] In May, 1860, I examined a patient, aged 56, who had had repeated attacks of palpitation, sense of suffocation, with expectoration of bloody mucus and a feeling of impending dissolution, but without pain, the paroxysms resembling angina, excepting the absence of pain. In the intervals between these attacks he was free from palpitation, did not suffer from want of breath on active exercise, and considered himself in good health. He had never had rheumatism. On examination of the chest, the heart was found to be enlarged, the enlargement being evidently by hypertrophy. At the apex was a pre-systolic blubbering murmur, which I then supposed to be characteristic of the button-hole contraction of the mitral orifice. At the base of the heart was an aortic regurgitant murmur, which was diffused over nearly the whole præcordia. There was no systolic murmur at the base or apex. Three days after this examination the patient was attacked with another paroxysm, and died in a few moments after the attack, sitting in his chair. The heart was enlarged, weighing $16\frac{1}{2}$ oz., the walls of the left ventricle measuring $\frac{4}{5}$ths of an inch. The aorta was atheromatous, and dilated so as to render the valvular segments evidently insufficient. The mitral valve presented nothing abnormal, save a few small vegetations at the base of the curtains, as seen from the auricular aspect of the orifice.

In this case it is assumed that the mitral direct murmur, which was loud and of the blubbering character, was not due to the minute vegetations which were found after death. There was no mitral contraction. The mitral valve was unimpaired, so that the murmur could not have been due to mitral regurgitation.

CASE 2.[2] In February, 1861, I was requested to determine the murmur in a case at the Charity Hospital, New Orleans. I found an aortic direct and an aortic regurgitant murmur, both murmurs being well marked. There was also a distinct pre-systolic murmur within the apex, having the blubbering character. On examination after death, the aorta was dilated and roughened with atheroma and calcareous deposit. The aortic segments were contracted, and evidently insufficient. The mitral curtains presented no lesions; the mitral orifice was neither contracted nor dilated, and the valve was evidently sufficient. The heart was considerably enlarged, weighing $17\frac{1}{2}$ oz., and the walls of the left ventricle were an inch in thickness.

In the second, as in the first of the foregoing cases, it is evident that a mitral systolic murmur was not mistaken for a mitral direct murmur, for in both cases, the conditions for a mitral systolic murmur were not present. In both cases the mitral direct murmur was loud and had that character of sound which I suppose to be due to vibration of the mitral curtains. In both cases, it will be observed, an aortic regurgitant murmur existed, and aortic insufficiency was found to exist post mortem. How is the occurrence of the mitral direct murmur in these cases to be explained? I shall give an explanation which is to my mind satisfactory.

[1] Private Records, vol. x. p. 713. [2] Ibid., vol. xi. p. 241.

The explanation involves a point connected with the physiological action of the auricular valves. Experiments show that when the ventricles are filled with a liquid, the valvular curtains are floated away from the ventricular sides, approximating to each other and tending to closure of the auricular orifice. In fact, as first shown by Drs. Baumgarten and Hamernik, of Germany, a forcible injection of liquid into the left ventricle through the auricular opening will cause a complete closure of this opening by the coaptation of the mitral curtains, so that these authors contend that the natural closure of the auricular orifices is effected, not by the contraction of the ventricles, but by the forcible current of blood propelled into the ventricles by the auricles. However this may be, that the mitral curtains are floated out and brought into apposition to each other by simply distending the ventricular cavity with liquid, is a fact sufficiently established and easily verified. Now in cases of considerable aortic insufficiency, the left ventricle is rapidly filled with blood flowing back from the aorta as well as from the auricle, before the auricular contraction takes place. The distension of the ventricle is such that the mitral curtains are brought into coaptation, and when the auricular contraction takes place the mitral direct current passing between the curtains throws them into vibration and gives rise to the characteristic blubbering murmur. The physical condition is in effect analogous to contraction of the mitral orifice from an adhesion of the curtains at their sides, the latter condition, as clinical observation abundantly proves, giving rise to a mitral direct murmur of a similar character.

A mitral direct murmur, then, may exist without mitral contraction and without any mitral lesions, provided there be aortic lesions involving considerable aortic regurgitation. This murmur by no means accompanies aortic regurgitant lesions as a rule; we meet with an aortic regurgitant murmur frequently when not accompanied by the mitral direct murmur. The circumstances which may be required to develop, functionally, the latter murmur, in addition to the amount of aortic regurgitation, remain to be ascertained. Probably enlargement of the left ventricle is one condition. The practical conclusion to be drawn from the two cases which have been given is, that a mitral direct murmur in a case presenting an aortic regurgitant murmur and cardiac enlargement, is not positive proof of the existence of mitral contraction or of any mitral lesions. The coexistence of a murmur denoting mitral regurgitation, in such a case, should be considered as rendering it probable that the mitral direct murmur is due to contraction or other lesions, and not functional.

Dr. Gairdner, in a recent article already referred to, proposes a change of name for the mitral direct murmur. He proposes to call it an auricular systolic murmur. Inasmuch as the murmur is produced by the systole of the left auricle, this name is significant. And the usual name is open to this criticism, viz.: it is not produced by the whole of the mitral direct current, but only that part of the current which is caused by the contraction

or systole of the auricle. From the situation of the auricles as regards the ventricles, the former being placed above the latter, and the free communication by means of the auriculo-ventricular openings, the blood must begin to flow from the auricles into the ventricles the instant the ventricular contractions cease. During the first part of the long pause or interval of silence, *i. e.*, the period after the second sound and before the subsequent first sound of the heart, the blood flows from the auricles into the ventricles simply in obedience to gravitation. It is not ascertained that this part of the current ever gives rise to a murmur. If it does, the murmur would follow immediately the second sound, or when an aortic regurgitant murmur occurs. I have conjectured that such a mitral direct murmur may occur, and that it is confounded with an aortic regurgitant murmur. This conjecture is based on cases in which an apparent aortic regurgitant murmur existed, and the aortic valves seemed to be nearly or quite sufficient on examination after death. However this may be, the mitral direct current giving rise to the murmur which has been considered in this article, is not the current which immediately follows the second sound, and is due to gravitation alone, but it is the current immediately preceding the ventricular systole, and due to the systole of the auricle. Hence, as it seems to me, the name proposed by Dr. Gairdner, being more specific and accurate, is to be preferred to that in common use.

ART. III.—*On Smallpox, and the Means of Protection against it.* By S. HENRY DICKSON, M. D., Professor of the Practice of Medicine in Jefferson Medical College, Philadelphia.

THE exanthemata may fairly claim a high place among the topics of greatest and most constant interest to the medical practitioner. They seem to solicit attention by their marked and impressive features; and present so many palpable, well-defined, objective phenomena, that we feel always as if on the point of receiving some clear and instructive developments from the study of the facts observed in their history and progress. At first sight their origin appears to be plainly traceable, their diagnosis distinct and easy, their nature obvious. But a closer examination will soon convince us that our knowledge of them is by no means so satisfactory as we had imagined, and that the field is still open for further and more minute exploration.

Three of the class of diseases to which the name has been attached exhibit in common certain striking characteristics, exclusively their own, and therefore well deserve to be set apart from all others, and arranged together. Smallpox, scarlatina, and measles are all of them eruptive affections, py-

rectic, contagious, self-limiting, and self-protective. They stand alone as to the concurrence of these conditions, one or more of which may belong to certain maladies, but all of them to none beside. Thus, hooping-cough, with no cutaneous eruption, is pyrectic, contagious, self-protective, and somewhat vaguely self-limiting. Dengue is irregularly eruptive as to constancy, characteristic appearance, and periods, though contagious and probably self-protective. Erysipelas is neither self-limiting nor self-protective; and the same negatives are true of varicella. It is perhaps worthy of remark in this connection, that all maladies which attack the human subject but once, and are in this sense self-protective, have been by various authorities regarded, and with some show of plausibility, as among the exanthemata. Pertussis is so considered by Watt; typhus and typhoid by many pathologists; Hildebrand ranges yellow fever thus in the catalogue, and several of our American brethren have confounded it with dengue, which has vastly better, though still insufficient, claims to that position.

The well-arranged, carefully prepared, and valuable "Report on Meteorology and Epidemics for 1861," read by Dr. Jewell before the College of Physicians of Philadelphia on the 5th of February, 1862, and published in the last (April) number of this Journal, contains some appalling statements in reference to the three pestilential affections there exclusively denominated exanthems. We learn from it that in the city of Philadelphia, containing 568,034 inhabitants, there died within twelve months from smallpox 758 persons; from scarlatina 1190; and from measles (of which it should be recollected that the fatal results are in great proportion indirect and masked under other names) 74. With most commendable industry, and with an intelligent zeal which entitles him to the thanks and highest respect of our profession, Dr. Jewell has collated, tabularly and otherwise, a large mass of useful facts and observations, in addition to the mere statistics of his report. Going back to 1807, he places before us a comparative view of the annual mortality of the most loathsome and destructive among them. We find it recorded of smallpox, which has figured largely in the bills of mortality for several years past, that the next highest number of deaths took place in 1852, 427; in 1856, 390; in 1824, 325. This terrible pestilence was, last year, about twice as fatal as at any time during the current century, with the exception of the year 1852, when the difference, 331, was not far below the greatest amount of mortality in the worst other year of the century. We cannot avoid being shocked at this retrograde exhibition, and shrinking from the acknowledgment of professional failure and defeat which it seems to imply. We are apt to take for granted—nay, I will maintain it to be positively true—that, fatal as this disease is even now, its proportional mortality has been vastly reduced. Fewer of those attacked die of it than formerly by a great difference, and we have occasion to notice much less deformity and mutilation by it. Allowing, then, for this diminished violence and destructiveness, we contemplate with horror the im-

mense mass of suffering which must in this community have overwhelmed the multitudes of miserable sick who passed through its wretched stages of varying infliction, recovering finally; many of them, doubtless, through tortures far worse than death itself. If we carry out our thoughts to the soldiers of the great armies now in the field, and the camp followers, and attendants, and refugees of all sorts, upon whom this scourge is widely and heavily laid, we shall shudder with quivering sympathy, and painfully lament the woes of our frail and afflicted race. And yet farther; when we reflect that all these horrors were preventible, and ought to have been prevented, our sympathy will be freely mingled with shame and remorse; shame, that in the light of advancing civilization, governments and law-makers should not have accepted, instituted, and enforced the proper means of preservation from such evil; and remorse at our remissness as a professional body, intrusted with the care of the physical well-being of our fellow-men, in not having urged, with unceasing and irresistible importunity, measures at once so important and so feasible. Dr. Jewell quotes and adopts the remark of an English writer, "that the absence of an efficient system of protection should be considered a national disgrace; almost a national crime;" and we must all acquiesce in and feel deeply the truth of the imputation.

I have read with much pleasure the observations made by Dr. Nebinger before the Philadelphia County Medical Society, on the 13th of November, 1861, on the subject of this essay, and given to the public in the *Phil. Med. and Surg. Reporter*, of March 29, 1862. I have already stated my accordance in his opinion that smallpox is better treated, and more successfully, now than in the days of Sydenham. During a long course of practice, I have myself lost so small a proportion of my variolous patients, that I am fully prepared to accept the favourable view he presented of his own good fortune. The data he then offered will assist us to estimate—approximately—the number of sick who suffered, but did not die. This is an essential element to a fair appreciation of the real value of prevention. I have always considered it a matter of great regret that we have no record of the extent of actually existing disease; its frequency; its duration; its degree; its calamitous privations and inflictions. Such a register is a necessary complement to the bare "bills of mortality," useful and instructive as these have become in the hands of Dr. Jewell and his collaborators.

Dr. Nebinger had seen more than 30 cases: he had among them 5 confluent; but one death occurred from them all. He ascribed this large success to his energetic efforts to sustain the strength of his patients during the progressive stages of maturation, suppuration, desquamation, and redintegration of cutis.

In a report prepared by Drs. Bell and Mitchell, of this city, we have a table of 248 cases given, of which 89 died—in the epidemic of 1823–24.

I saw smallpox prevailing extensively in New York during 1848 and 1849. Many of the members of the medical class in the University in which I then held the chair of the Practice of Physic, were attacked; of these, 50 or more in number, only 2 died. Averaging these three statements, each of which is extreme, two of them in good fortune, and one in the reverse, we have 1 death in about 3½ cases, reaching a total of 2653 sick.

Gregory estimates the average mortality all over the world as 1 in 6. In Dr. John Davy's *Notes and Observations on the Ionian Islands and Malta*, there is an interesting history of "the Variolous Epidemic of 1830–31, in Malta." The deaths were 1172 out of 8067 cases reported; "many cases occurred which were not reported; of the mildest kind, probably." These proportions would give us about 5000 cases of smallpox in one year in this favoured city. If we take from the very happy rate of success announced by Dr. Nebinger, fully two-thirds—and we should remember that both Drs. Burns and Remington "fully agreed with him, and added their testimony as to the good results of his mode of treatment"—if we admit, I say, that Dr. N. was singularly fortunate, and subtract two-thirds as approaching the more general average, making the deaths 1 in 10 of the whole aggregate of cases, we shall find our sick amounting to 7580. What an accumulation of anguish! What an infinite sum of wretchedness! Few of them could have been ill a shorter time than a week, in greater or less degree; at least half of them would be in an invalid condition, and in a state of feeble convalescence for two and three weeks, many even more than this; and although two-thirds of them were young children, yet they would require, each of them, an adult attendant. Putting the average duration of illness, then, at ten days, 75,800 days of useful life would be lost to the individuals; of ordinary labour to the community—more than two hundred years of privation, suffering, and sorrow!

This calculation would be irrelevant and useless, if we were treating of an inevitable form of calamity; but I hold the contrary to be positive truth here. I believe it to be in the power of all civilized and well governed communities to confine within very narrow limits, or rather to exterminate the pestilence under discussion. I contend that it is their bounden duty to set about this purpose at once and without delay, and to press the effort with energetic constancy. It is hardly requisite, I presume, that I should explain my meaning in the use of the words "extermination" and "extirpation." I surely have not conceived the idea of physical annihilation of the virus of smallpox, or the disease variola, ontologically or dynamically considered. What I intend and aim at is its *extinction as an epidemic*, as a *pestilence;* its *obliteration from the bills of mortality.* It will be seen that the course which I am about to propose with this view implies the constant employment, and of course the preservation of smallpox matter, as we now keep up and preserve the vaccine. It may happen, which

Heaven grant! that this dreaded virus may hereafter become difficult to procure, and a supply will need to be sought out of the bounds of civilization and well-ordered governments. Such a supply will always doubtless be within reach, among the barbarous hordes of Africa, Asia, and South America.

But if we may trust in familiar observation and repeated tabular statements, we are possessed of means of defence against the spread of this repulsive malady, and also against its fatal violence, which may be made available to an extent as yet matter only of reasonable calculation and hopeful estimate. Very few deaths proportionally or absolutely occur from inoculated smallpox; very few from smallpox after vaccination: it will be seen that I would combine universally and regularly the modifying and palliative influences of the two, by inoculation superimposed upon vaccination. In two out of three cases hereafter referred to, the result of such inoculation was "local affection without any fever or eruption; in the third, local affection without fever, but with papular eruption on the seventh day, not advancing to vesicles." It remains to be ascertained whether such effects as these would comprise the general history on a great scale; and whether the influence exerted on the constitution would be as thoroughly protective as I am disposed to anticipate. Should there be no disappointment in these respects, surely it is not visionary to hope for as few deaths from smallpox in the next generation as now from vaccine.

The majority, even of my professional brethren, may perhaps continue to think that I exaggerate the competency of the means proposed: yet no one will doubt or deny that much, very much of what is contemplated, may be done by their vigorous and unremitting application. In order properly to appreciate, however, the value and probable efficacy of our means of restriction, prevention, and extirpation, we must carefully consider the modes of origin and propagation of the disease we are to contend with.

1. Does variola ever arise spontaneously, or from ordinary contingencies, or under any known or suggested circumstances of defective or vicious hygiene?

2. Does it arise from degradation or intensification of any other known forms of disease, which may themselves originate spontaneously or accidentally? Or,

3. Does it always require a specific infection, an implantation, or efficient impression from a previous case fully and characteristically developed? There are no other imaginable alternatives, I believe; and it is not easy to obtain an answer perfectly satisfactory to either of the above questions, although we may reach a fair practical result.

1. I will not venture to deny the *possibility* of "spontaneous generation" of smallpox. It came into existence once, and therefore logically may again occur, provided the same conditions coincide again to produce it. Nor am

I unaware that there are several instances on record, in which the breaking out of the disease has been totally unaccountable. Nay, I have myself met with and published a history of one of the strongest and strangest among the cases that have been observed. I need not say that such rare facts ought to be studied with the admission that our knowledge of the entire range of details must always be incomplete, and that it will be safest and most reasonable to follow the patent and obvious course of known analogies in forming our opinions. Ordinary pollutions of the atmosphere produce their known effects; none have been defined or even conjectured of a nature causative of variola. It is easy to enumerate and imagine obscure and extremely varied modes of its infectious communication wherever social and commercial intercourse obtains. We know the tenacity of its contagion, and shall treat of its great diversity of vehicles. We have no account of its outbreak where such conveyance was not demonstrably possible at least; and if possible, it at once becomes more probable and presumable than the vague hypothesis of "spontaneous generation." Besides this, speaking practically, such instances will be amenable to the same methods of prevention that will affect, as we hope, all the others, and even in special degree. For there is no alleged example, among all these strange seizures, of *persons protected*, either by vaccination or previous attack, having been the subjects of obscure invasion. These yield only to the more vehement impressions of obvious and definite exposure.

2. The second inquiry presents some intrinsic difficulties, and is not readily disposed of. We might at once cut the Gordian knot, and pronounce dogmatically with Copeland and Gregory that "the whole confusion arises from mistaken diagnosis;" but I will not think or speak thus lightly of the observations and opinions of such men as Howitz and Bateman, and Hennen and Thomson. The very authorities above quoted admit "that there is a form of smallpox which may be mistaken for varicella;" Gregory makes indeed a class of "varicelloid cases." The true question is whether or not they actually run into each other, and are capable of mutual generation. Of the difficulty of clearly distinguishing them, every practitioner should be cautiously aware. Dr. Davy tells us of the Maltese epidemic of 1830–31, that "in most instances when the disease occurred after vaccination, it was mild and short in its course, often resembling chicken-pox rather than smallpox. Chicken-pox was at the same time common, ninety-one cases being reported." He regards the diagnosis as doubtful, and mentions a case occurring three months after the last report of smallpox, which he "thought to be genuine variola, though mild. It was among some cases of chicken-pox that it happened." Gregory, dwelling on the capricious mingling of the severe and slight varieties of smallpox, says, "A confluent case shall give origin to a varioloid, and a mild distinct, and even a varicelloid case; and these shall generate in their turn malignancy and confluence."

The spontaneity, that is, the independence of any specific sources of production of varicella is universally taken for granted. It has never been proved, nor, on the other hand, so far as I know, questioned. Yet it has clearly a very relevant and important bearing upon our main subject. Enough has been said to show the danger of error here. Nevertheless, and in spite of all these warnings, fatal mistakes continue to be made by experienced physicians. On three occasions I have known smallpox to spread from infection communicated by cases pronounced to be varicella; the first and introducing instances being slight and of mild character, followed by development of marked cases of violence and malignity. I have now before me a melancholy "appeal to the public" of a city into which the writer had been the unhappy agent of importation of smallpox, quite recently. The disease spread and prevailed epidemically in a very fatal form, and he became odious under the imputation, as his printed statement expresses it, of "recklessly sowing the seeds of the most contagious and loathsome of maladies, by freely mingling with the people while knowing that he carried the deadly infection about his person." He affirms that he returned home from New York in perfectly sound health; that being attacked a few days after with a slight illness, accompanied by an eruption on his face and body, he consulted an "eminent physician," who unhesitatingly pronounced the eruption to be chicken-pox, and told him he might resume his business without fear. "Nor did the idea of smallpox once cross my mind until, after my own child had caught the infection in an aggravated form and fallen a victim, the physicians began to whisper the dreaded name."

The preponderance in number of what are called "negative facts," examples of innoxious presence and prevalence of varicella, should never be allowed to lull our caution to sleep. No prudent practitioner will fail to watch attentively the course of chicken-pox in any group or collection of unprotected subjects. I do not believe it to be possible to diagnosticate from it by any definable marks some of the irregular varioloid affections, which yet are potential in spreading smallpox; and even those who contend most peremptorily for precise distinctions, allow that we do meet with a "confounding" similarity. Where there exists any doubt, we should have prompt recourse to the most immediate protective measures.

Nor must we entirely pretermit the consideration of another possible origin or development of smallpox. Its identity with vaccine is at the present day the received doctrine with the majority of our profession. I will neither affirm nor deny it, but proceed, *ex abundante cautela*, to draw from it a practical inference. If it be true that vaccine is a modified or degenerate variola, altered in its features and history by transmission into and through organisms of lower type, it would be difficult to imagine why it should not, when restored to its original nidus and pabulum, resume, under fostering contingencies, its original characteristics. Some startling

examples have occurred, as not long ago at Richmond, of the introduction of smallpox with matter supposed to be vaccine, and the explanation has been accepted that an unfortunate accidental mixture of the two contagious viruses had taken place. No one now doubts that vaccine may arise spontaneously in the cow; Jenner thought, erroneously, that it depended upon an equine affection, "the grease;" Baron and Ceeley have attempted to prove that they are both variolous. And even if with Gregory we dissent from their conclusions, and accept with him the views of Creaser, we do not escape from reasonable fear of possible danger: if "a morbid poison applied to different animals produces, not a similar and specific disease, but the disease to which the animal from constitution and structure is predisposed." "Equine matter, vaccine lymph, variolous matter—each, when applied to the vessels of the cow, develops vaccinia," says Gregory. It would be difficult to show, upon this view, why, when applied to the vessels of the human subject, they should not develop smallpox.

And what shall we say of cases in which "there is a general eruption of Vaccine Vesicles over the body, resembling, in some patients, those of Varicella," as we find it stated in the notes to Gregory's excellent work on *Eruptive Fevers*. To the small number of these hitherto recorded, I will add one from the pen of a physician, himself the subject. It is described in the following extract of a letter to me from Dr. Henry H. Cone.

I was inoculated in the year 1815, by Dr. Samuel B. Woodward, of Wethersfield, Conn., immediately after having been somewhat exposed to the contagion of smallpox. The vaccine matter was inserted in two places, about the middle and anterior part of the left arm. At the usual time the genuine symptoms of cowpox made their appearance, such as the gradual formation of pustules which continued to increase until they had attained the usual size. Along with the two pustules, which formed at the places where the virus was inserted, were three others on different parts of the body, which were a day or two later, according to the best of my recollection. One of these was situated on the right arm at its upper and anterior part, forbidding the possibility of its coming in contact with or originating in the direct application of the virus; another was situated on the right thigh; the third on the parietes or surface of the abdomen. The three last mentioned pustules were in no respect different from those which formed at the places where the matter was inserted, neither are the remaining cicatrices, all of them being marked with small pits or depressions near their margins. There was some symptomatic fever: though not so much as to deter me from my ordinary pursuits.

In two of the instances from Gregory, the matter of the extra pustules was experimented with and genuine vaccine resulted. I will confess to some apprehension, that in examples of this constitutionally eruptive impression of vaccine, and especially where the pustules resembled varicella more or less, there would be a risk of arousing the "varioloid predisposition" of Gregory and Creaser. A "very curious case" indeed is given in the notes above referred to, of a "constitutional vesicle" breaking out at a distance from the points at which the matter was inserted; the "three incisions" made there healing up without effect. An instructive example

is given in the same place, of the similarity of various eruptions, enough, surely, to account for much "confusion" and many mistakes.

A child eighteen months old, vaccinated a fortnight before, had *well characterized* vaccine vesicles on the external labia, and also on the perineum and about the anus. The vesicles bore some resemblance to certain forms of venereal eruption appearing about those parts in children and the case was carefully examined in reference to this point.

All such irregularities deserve special study. So also does the retardation of the vaccine influence within the system, where it sometimes remains, holding by a tenure very obscure. Not to dwell on mere delay of the local and general effect of the insertion of the virus, which is stated in various instances to have lasted from 14 days to six months; we may refer to an example of very peculiar character, related in detail by Dr. Ruprecht, of its renewal or relapse after several years' interval.

A girl of 14, being seized with influenza, complained of pain in each arm at the spots where, when an infant, she had been vaccinated; and in these localities vaccine vesicles became perfectly developed. An elder sister was revaccinated with the lymph hence obtained; beautiful vesicles formed, and ran a normal course.—Vide *Brit. and For. Review*, April, 1850.

3. When smallpox shows itself without obvious infection derived from a specific instance previously developed, the apparent exception must come under one of the heads already discussed. It does not seem to me to affect the question, if we admit the fullest efficiency that has ever been supposed to belong to what is called "Epidemic influence," unless this influence can be shown to act independently of the presence of a case or cases previously developed. Nothing can be more vague than the familiar use of the above phrase. Every one is aware that all diseases prevail with greater promptness, their causes known and unknown act with greater efficiency, over wider spaces, and include larger numbers, at certain periods than at others. It is probable, indeed, that any malady may find in atmospheric contingencies favouring elements; but these are favouring, fostering, not generative. We must not confound the parent with the nurse. Diseases both contagious and non-contagious thus become epidemic. It is noticeable, too, that epidemics vary, at different times, in their degree of malignity or proportional mortality, which is not, by any means, in uniform correspondence with their extent or sway over numbers. Prof. Wood has pronounced it "highly probable that the epidemic influence may be alone sufficient to produce smallpox, scarlatina, and other contagious eruptive affections, without the co-operation of the specific contagion." Even if the idea be correct, the expression here used is too strong. It can hardly be said that anything is highly probable, unless some good reason can be given for the belief that it has once occurred. I have admitted the possibility of such an event; but it would be an incident both rare and mysterious. No one would say that he expected or anticipated it under any contingencies which he could describe or define. Epidemic influences, *ex vi termini*, act upon a

great many simultaneously. Influenza, cholera, &c., are known to affect numerous subjects at once. On the contrary, the obscurely induced attacks of smallpox have always at first, and generally altogether, been confined to a single individual, with whom the affair may end; or it may subsequently spread more or less widely. We have agreed to stigmatize "the absence of an efficient system of protection as a national disgrace, almost a national crime." The appropriateness of this sentiment, it ought to be added, must entirely depend upon the feasibility of such protection. If the origin and spread of smallpox be probably ascribed to any unintelligible and uncontrollable mode of causation, and such are all epidemic influences, then there is neither disgrace nor crime in the failure to protect. Believing, however, as I do, that the introduction and propagation of this pestilence are well enough understood for all practical purposes, I do regard all governments as responsible for the institution of proper and relevant efforts at prevention and circumscription, and deeply guilty when this is neglected.

Smallpox propagates itself, or is propagated, 1. By actual inoculation, insertion of the virus. 2. By contact with the sick. 3. By near approach or immersion in polluted air. 4. By fomites, either applied directly to the surface, or acting through the air about them. 5. By diffusion of infectious matter through the atmosphere to an undefined extent; which constitutes, doubtless, the chief, if not the exclusive, element, in epidemic dissemination. This is obviously more effective in certain atmospheric conditions, known and unknown, often or generally observed to be associated with ochlesis, the crowd-poison, which also gives force to the third mode, or, indeed, all of them. Many unfavourable hygienic conditions act rather on the constitutions of the subjects, than by multiplying or concentrating or intensifying the subtle virus engendered by the pestilence.

Inoculation of smallpox is prohibited by law in Great Britain, and has fallen into disuse in our own country. Contact with the sick is more difficult to be prevented than one would think. It is not known how soon the subject becomes a dangerous centre of evil, nor for how long. Near approach by accident must often happen, while those ill of mild attacks, or convalescent, are permitted to make use of public vehicles and common paths. Civilization renders impossible the abandonment of the miserable sick, under any circumstances; but it is always easy to find nurses hardened against infection by previous attacks. Fomites are sources of widest danger, because they are of such vast variety, and often, therefore, unsuspected. We may refer to all garments, bedclothing, textile furniture, such as carpets, curtains, stuffed and covered chairs, &c. The tenacity with which such objects retain their evil potency is remarkable. A story is told by Mills of a child dying of smallpox in its cradle. The bedclothes were carefully washed and put away; a year after they were brought out for the use of another infant, born to occupy the same cradle; this new-comer soon took smallpox, and also died, no other instance of the disease being known

to exist anywhere else in that region of country. Carriages, both public and private which have been used for conveying the sick, are dangerous fomites. Bank-notes handled by them are very reasonably denounced also by Dr. Buckler, of Baltimore. The dead body itself may act very efficiently as fomites. I remember a case which appears strongly in point. During the winter of 1848–49, a young man, a member of the medical class of the New York University, died suddenly and unexpectedly in the night, under the care of a physician who had not thought him seriously ill. I was invited to the autopsy, and observed, when the corpse was uncovered, a few dark-red spots on the surface, which were supposed to be petechial; the principal symptoms of his attack having been gastric, with great debility, as we were informed. The coffin was taken home to a New England village, for burial; where, at the funeral, some of the relatives approached and opened it, to see the face of the deceased, before it was inhumed. Of this number, eight were attacked with smallpox, no other persons in the neighbourhood being assailed. It was afterwards thought probable that the youth had attended the wards of some hospital in the metropolis, and had been affected with the disease which at that time was in existence there.

I have omitted to speak under this category of books, paper, letters, solid wooden articles, and the walls and floors of houses, as disputable; although there are instances, repeated often enough on the records, to excite caution at least, of the reception of the contagion through the post; by handling walking sticks and other implements; and by inhabiting apartments in which the sick had lain long ago, and from which all suspicious furniture had been removed. Atmospheric diffusion is, however, by far the most injurious method in which this, like other forms of pestilence, propagates itself. Nothing in nature can be more obscure or hard to apprehend than the varying conditions which surround us, all of them comprised under the familiar phrase "constitution of the air," though we know not whether they are telluric or astral, electric, or thermal; unappreciable diversities, at one time indifferent to the presence of a contagious malady, at another opposed or unfriendly, or unadapted to its spread; again, giving it wings, as it were, and aiding its extension; exhibiting an evil influence by rapid increase of the number of subjects attacked on certain occasions; and on others, by impressing a peculiar character of violence and malignity upon a narrower range of prevalence. Against this danger, so stealthy, so impalpable, no ordinary precautions are of any avail, whether personal or hygienic. Of the first forty cases which I saw in New York during the epidemic of 1848–49, there was not one who was conscious of having approached a patient affected with the disease, or who, upon close inquiry, such as it was my habit to make, could be brought to recollect having placed him or herself in circumstances of any imaginable suspicion of risk.

Happily, we are provided with special and relevant means of defence, applicable alike in all the varying conditions above enumerated and alluded to, and available against all the several modes of extension or propagation. Among the strongest points of contrast in the histories of disease, none is more striking than this: that certain individuals on the long catalogue create in the constitution which they intrude upon, a propensity, or, to speak technically, a predisposition to be more readily affected by them a second and a third time, and so on indefinitely; thus it is with malarial fevers, erysipelas, gout, rheumatism, &c.; while certain others exhibit a directly opposite tendency, being, as I have styled them, self-protective; and giving to any constitution over which they have once prevailed, a strange immunity against their recurrence. This is the rule—broken doubtless by exceptions—but it is the undenied rule. Upon this peculiar characteristic belonging to the exanthemata, is based the hope as to all the three, the certainty as to the one under discussion, of being able to circumscribe, restrain it, reduce it to subjection, and, if we desire, to extirpate it entirely.

The most ingenious speculators have offered us no plausible explanation of this curious and fortunate fact or law. Of the various conjectures thrown out, it may suffice to mention two wild and inconclusive hypotheses, which have been suggested by the analogies of vegetable life and growth: one, that every human being is born with certain elements of organic composition, which afford opportunity or pabulum for certain morbid changes. The pabulum of each morbid affection being once consumed, is not again reproduced, and the changes in which that consisted cannot again take place; and thus, hooping-cough and measles, scarlet fever and small-pox, and perhaps some others defend against themselves. The other hypothesis is equally fanciful, and assumes that, in the course of certain maladies, new products are evolved, which are permanently retained in the system, preventive of the same actions which originated them; as the roots of a vegetable are supposed by some to leave in the soil where it has grown certain effete matters or exuviæ, unfriendly to its life, whence the necessity for a rotation of crops; or as animals even in health, fill any confined space around them with noxious effluvia, demanding perpetual change of air and involvements. The well-ascertained law or fact suffices for our cherished purpose.

Again, it has been long known also that smallpox, which, taken "in the natural way," either by contact, near approach, from fomites, or when epidemically diffused, is one of the most fatal as well as repulsive of human disorders, puts on a far milder and less malignant character when introduced into the system by a wound in the skin, "inoculation." Asia and Africa, the most ancient seats of this terrible pest, have long known and still avail themselves of this mode of palliation. England resisted it obstinately, yielded to it reluctantly, and has now fatuitously prohibited it.

We have been indifferent to it, and act as if averse on principle to any interference with every man's right to be poisoned at his own will. Inoculation was first practised by civilized hands at Constantinople, in 1700; it was introduced to the English and brought across the Atlantic twenty-one years after; and so completely superseded by Jenner's vaccination, promulgated in 1798, that in 1840 it was "declared illegal by the British Parliament, and offenders sent to prison," says Gregory, "with a good chance of the treadmill." Its alleged influence in lessening the mortality of smallpox is indeed marvellous, and scarcely credible. The author just named tells us that "with ordinary precautions, not more than one case in five hundred will terminate unfavourably." He denies positively, and opposes strongly, both by fact and argument, the assumption which has prevailed widely, and is maintained by Sir Gilbert Blane, that "it disseminated the virus, increasing the foci of contagion; and thus favoured the spread of the disease," demonstrating, I think, its falsity. Indeed, so much are the violence, the suffering, and the proportional mortality of smallpox diminished by inoculation, that I would advocate unhesitatingly the propriety of universal inoculation at as early a period of life as was ascertained by repeated and careful experiment to be safe and allowable. I would have such inoculation repeated at short intervals, until in every subject the point of absolute incapacity to receive the infection was fairly reached. This would happen in a majority of instances with the first efficient incision of the virus; it would probably take place in the rarest exceptional cases of renewed susceptibility, after a very few repetitions. Those who had gone through this process would be proof for the future against the pestilence, and as to them it would be annihilated, virtually exterminated. And as all constitutional peculiarities are hereditarily transmitted, whether of original organization or in any way acquired, so this anti-proclivity or acquired immunity would go down increasing in force with every generation, until the whole race would become insusceptible of this horrid mode of dying. But this is only half my plan.

However palliated by inoculation, smallpox would still demand and engulf a certain proportion of victims; and besides, would inflict in its course a considerable amount of unavoidable suffering. With grateful exultation we may reflect that we have in our hands a means of still reducing, to a minimum yet more remarkable, the evil against which we are contending. For this purpose we confidently resort to the vaccine. Whether of identical origin with variola or not; whether primarily a human disease altered in course and history, clipped and abridged of its first atrocious properties by transmission through some of the lower organisms; or primarily an equine or bovine distemper, genially adapted to the service of our dominant race, vaccine exhibits a close and most beneficial relation with smallpox. An enviable immortality glorifies the name of Jenner, as having made known this invaluable relation. Although not

self-protective, it protects in a remarkable degree against smallpox. This protection we have learned is far from being absolute, though Jenner thought and pronounced it so. In his petition to Parliament (1802) it is stated that he "had discovered a means of rendering through life the person protected by it, *perfectly secure* from the infection of smallpox." For some time the public indulged the same sanguine anticipation, which, I need not say, is now universally abandoned. I have myself attended a pretty severe case of variola—or as some would insist on terming it, varioloid, in a lady vaccinated by Dr. Jenner with his own hands. In Davy's tabular view of the Maltese epidemic, out of 8067 reported cases, 2720 are set down as "supposed vaccinated," and 390 as "well vaccinated." But I will not dwell on this point. As a protective, vaccine employed alone has failed. Perhaps the same failure may be as truly affirmed of inoculation employed alone. In Davy's tables, 97 are set down as "having had smallpox before." He mentions as authentic the case of "a lady, mother of ten children, who had smallpox eleven times! first in infancy, and afterwards when each of her children had it; these last being as severe as the first." The books abound with similar statements. It is certain that particular constitutions admit one or the other of these analogous affections, and yet not both. A case is mentioned in the *British and Foreign Review*, October, 1859, where vaccination was attempted many times in vain; the patient had smallpox severely at the ages of twelve, forty-three, and forty-five. What would have been the effect in such an instance of early inoculation, repeated, as I have proposed, at short intervals, to exhaust the proclivity or susceptibility? There is a difference in this respect in races as well as individuals. The Easterns are very susceptible of smallpox; but I have heard one of the American missionaries to Siam assert that for seventeen years they were foiled in every attempt to introduce vaccine among the willing people. Some systems repel both contagions. I vaccinated many times and inoculated repeatedly with variolous virus, all in vain, a young lady. She afterwards nursed with impunity a sister "supposed vaccinated," who died of confluent smallpox; this latter had never been my patient.

Now, if the reader has given me his patient attention, he will, I am disposed to think, agree with me that each of these two inestimable methods of protection is unfortunately imperfect, insufficient when employed alone, and undeserving of our full confidence. Regarding them as complements, each of the other, I would institute the employment of them both. Vaccine is the most certain in its action as a *modifier*. In all the tables we find the proportion of deaths in smallpox after vaccine set down as smaller than among those who are marked as "having had smallpox." Variola is, on the other hand, the more efficient preventive or *protective*. By the resort to both of them, we obtain the double advantage of uniform palliation, and more certain protection, or obliteration of original susceptibility.

Gregory tells us that "smallpox in the unvaccinated is five times more fatal than it is to those who have previously undergone vaccination." The latter should, therefore, precede the former. Revaccination, at distant intervals, better regular, of course, than irregular or capricious, can have no advantage over the plan proposed. It is uncertain whether it ever does away the susceptibility to its own reception. Many series of experiments are required to decide this point, and I know of none but those made by Dr. Darrach, of this city, which have not been repeated. I think we have reason to doubt whether in all individuals any number of revaccinations would be securely protective; wisdom inculcates the course of greatest safety, which consists in following up vaccination by inoculation, especially if we repeat the latter to exhaustion of susceptibility. The experienced practitioner last quoted, and so often referred to as high authority, goes on saying, "I inoculated three of my own children, at the ages of twelve, thirteen, and fourteen, after successful vaccination in infancy, and the result was as follows: in two, local affection, without any fever or eruption. In the third case, there was local affection without fever, but with papular eruption on the seventh day, not advancing to vesicles. I firmly believe that these children are now and will remain through life unsusceptible of smallpox." In this belief I fully accord with the writer, and entertain strongly the opinion that there is no other way of obtaining such complete security.

Let me refer again to the "report" of Dr. Jewell. "In a former report," says Dr. J., "I have alluded to the inadequacy of voluntary provision to secure us from the ravages of smallpox, and I have elsewhere asserted that nothing less than a compulsory law, with a penalty attached for its violation, would prove an effectual barrier, &c." What then shall be done?

There are two difficulties in the way of efficient action here. The first is the universal *vis inertiæ*, opposed not only to all innovation, but to all movement of any kind. Yet if the medical profession were as a body to engage with earnestness and zeal in their duty, the great inert public might be roused, and much good be effected. But at best this would be only a partial success. I am satisfied that the inattention, indifference, and inaction of even the most enlightened communities as to this matter, are owing to their want of clear conviction, their imperfect trust in the security attainable by the measures urged; and this is the second and greatest difficulty before us. Nor can such incredulity be considered unreasonable, when we reflect upon the vacillation, the avowed scepticism and open opposition of experts, and men of weight, influence, and knowledge, both in and out of the profession. Recollect that opportunity has never been given for the attainment of confidence, Chatham's "plant of slow growth," in any of the means brought to their view. Inoculation was from the first unpopular and scouted by those who feared to try a new method, involving a reluctant familiarity with a dreaded enemy. When it had just outlived opposition,

it was supplanted by vaccination, which promised so much, and was at the beginning so fortunate. But soon, very soon, this good fortune came to an end, and the exaggerated promises were found to be unfulfilled; and disappointed faith shrunk into doubt and disbelief. I do not despair of reviving the spirit of earnest inquiry and active experiment. The evil is so great in the present, and so menacing for the future, that if physicians will everywhere unite upon some system, we may reasonably hope to obtain from the constituted authorities the inauguration of some effective measures of coercion. A sense of the necessity of harmony among ourselves should lead to rational compromise and unity of effort. There are among us some who place little reliance upon the protective power of vaccine; there are some who dread the presence, in any form, of variola. None of us, so far as I am acquainted with my brethren and their opinions, none of us doubt the self-protective immunities of smallpox, or the happily palliative, modifying tendency of vaccine. Let us then with energy, perseverance, and unanimity recommend to all civilized governments the combined employment of these two safeguards. Let us procure that it shall be ordained that every child shall undergo vaccination by some expert within a month after birth; that as soon as the constitution shall have gone through its influence, inoculation with variolous virus shall be performed, and that this latter operation shall be repeated again and again at brief intervals, until all reasonable satisfaction has been attained, of the entire extinction of the susceptibility to smallpox.

I am aware that there are some, even among my friends, who will regard all that I have written as mere Utopian speculation. Others will foresee invincible obstacles in the details necessary to carry out any plan which may be instituted. To the former I offer my entreaties that they would lay aside their inactive scepticism and join in the labours of more hopeful or sanguine philanthropists. I might say to the latter that I have not found it difficult to prepare a series of ordinances, which I refrain from presenting to them, partly because it would occupy too much time and space; but for the still better reason that when it is once determined to act in the premises, the first step of such action ought to be a careful and deliberate consultation as to the *modus operandi*. I shall consider myself one of the most fortunate and happiest of men, if I prevail in arousing my medical brethren and my fellow citizens to some determined and general effort at the restriction, palliation, and extermination of one of the most enormous evils which afflict our common humanity.

ART. IV.—*Amaurosis and other Disorders of the Eye, resulting from Injury of the Terminal Branches of the Fifth Pair of Nerves.* By FREDERIC D. LENTE, M. D., of Cold Spring, New York.

THAT lesion of the fifth pair at some point within the skull, or of that portion of the cerebral substance from which they take their origin, will cause a disturbance, more or less serious, of the organ of vision itself, sometimes in its function, sometimes also in its structure, terminating occasionally in its total disorganization, is a fact established as well by the experiments of Magendie and other physiologists, as by the observations of various pathologists in diseases of the brain.

A number of cases of traumatic amaurosis arising apparently from injury of the external parts adjacent to the eye, which have fallen under my observation from time to time, have induced the conviction that disturbance of vision, resulting in asthenopia, or in amaurosis, may ensue as well from injury of the terminal branches of the fifth pair, as from that portion which forms a part of the encephalon.

The consequences which follow injuries about the orbit, as affecting the eye, are referable to three heads: First, concussion, or other injury of the brain or eyeball; secondly, development of inflammation, or other disease within the eye, resulting in gradual impairment, or loss of vision, sometimes even in destruction of the eye; thirdly, a sympathetic or reflex influence on the retina or optic nerve, developed sometimes immediately, sometimes after a longer or shorter interval, as a result of the direct lesion of the nerve filaments, or in consequence of processes of repair succeeding the injury. *Diseases* also of the periorbital region have been followed by phenomena that have been referred to the last two heads.

Modern writers on diseases of the eye devote but little attention to this subject, and generally refer the disturbance of sight and other *sequelæ* to the first head—that is, direct injury of the eyeball or brain; in some instances also, to the second head. Thus, Lawrence, Middlemore, Sichel, Tyrrell, Wharton Jones, Haynes Walton, Mackenzie, all seem to be more or less inclined to this opinion. The latter, who enters into the discussion of this subject, especially in his later editions, more extensively than the others, after relating many instances, as we shall presently see, very plainly indicating the nervous injury as the direct cause of the affection of the eye, yet concludes his remarks by saying that "the consideration of these facts naturally leads us to regard with still greater doubt the alleged occurrence of purely sympathetic amaurosis from slight injuries of the fifth pair, and to suspect that, in the supposed cases of this sort, there has been, in addition to the external injury, either concussion of the eyeball, or disease excited within the cranium." The first case which we shall relate, and

which occurred nearly twelve years ago, during my residence as house surgeon in the New York Hospital, led me to adopt a different opinion; and a further investigation of the matter only confirmed this opinion. My attention has lately been recalled to this subject by the publication, in the *American Medical Times* for March 15, by my friend Dr. Noyes, of the New York Eye Infirmary, of a similar case, to the extremely interesting history of which I shall hereafter advert; also by some interesting commentaries on this case in a succeeding number of the same journal, by M. Echeverria. The matter has been invested with a medico-legal interest in consequence of the publication of the report of a trial in the last edition of Walton's Treatise on the Eye. Dr. Walton and several other surgeons of note were employed by the London and Northwestern R. R. Co., who were sued for heavy damages by a watchmaker, who had received a very trivial injury about the eye, but who subsequently became in a measure incapacitated for his particular occupation in consequence, as was alleged, of this injury. "The question of amaurosis, depending immediately or ultimately upon injury of the nerve, was raised by the patient's counsel." I am now quoting from Dr. Noyes' article: "Mr. Walton testified that in his opinion '*mere injury of the nerve-branch* on *the head can have no effect on the function of the retina; that loss of sight, when associated with such lesion, is due to coincident lesion of the eyeball.*'"[1] The plaintiff's counsel referred to numerous cases recorded by authorities, disproving this opinion, and the chief justice seemed to be particularly severe on these records. The medico-legal bearing which, as we see, this question may assume, would, of itself, render a full investigation important; for, the cases recorded in this paper, taken in connection with the evidence scattered among the various authors on diseases of the eye, which we shall presently endeavour briefly to collate, will, in our opinion, go far towards invalidating, if indeed it does not completely annul this decision of Mr. Walton. But, we shall also find that the discussion will have a practical bearing on the *treatment* of certain affections of the eye. We indulge the hope, therefore, that though this paper may prove tedious in some of its details, it may not be entirely unprofitable.

Case I. Antoinette H., 11 years of age, an interesting and intelligent girl, was brought to me at the hospital as an out patient on the 6th of July, 1850. On the 4th a boy snapped a percussion pistol near her; and, a fragment of the copper cap flying off, struck her in the face. There was a small wound on the left side of the forehead near the median line, which bled freely for a time, but caused little pain. But little concern for the injury was felt at the time; but, on the day following, the little girl complained of severe pain in the *right* eye, and around the *right* orbit, of a "*numbness*" *extending from the wound* on the *left* side of the forehead as far as the *right* temple, and also of dimness of vision of the *right* eye. All

[1] The words are Dr. Walton's; the Italics are mine.

these symptoms have been increasing to the present time, especially the last. The right eye is now amaurotic, patient having but little more than the perception of light; being unable to distinguish with it even large objects near her; patient seems rather disinclined to face the full light of day. The pain in and around the eye is quite severe, and is much increased *by pressing upon the seat of the wound of the forehead.* At this point, which is a little to the left of the median line and about half an inch below the line of the hair, there is the appearance of a slight abrasion of the cuticle, and a small circumscribed induration, as if from effusion of lymph; no foreign body can be felt. There is a slight redness of the right eye. Patient is of nervous temperament, and in rather feeble health; was in Paris during the late revolution there, and her nervous system received a shock from which it has not yet recovered. Judging that a piece of the copper cap had lodged in the forehead, and had originated and was maintaining the amaurotic symptoms, I determined, with the concurrence of my colleague, Dr. W. H. Church, now one of the surgeons of Bellevue Hospital, and medical director in the Army, to search for and remove it. After making an incision, and searching for some time, we found, imbedded firmly in the pericranium, a jagged fragment of cap, which we removed. During the somewhat protracted exploration of the wound, patient complained of very severe pain *extending from it,* towards the *right* eye, and in the right eyeball itself. Immediately after the removal of the fragment the pain abated, was less than before the operation, and *vision was in a great measure restored,* patient distinguishing even small objects without difficulty. Both Dr. Church and myself were much surprised and gratified at the unexpected success of our little operation. Directed quietude, low diet, a gentle laxative, and the application of a cooling lotion to the eye.

July 7. The "numbness" complained of as affecting the *right* side of the forehead, has there abated, and has extended to the *left* temple. The left eye also is painful, slightly injected, and vision somewhat impaired. The inflammatory symptoms of the right eye have much increased; the pain in the globe is deep seated, and increased by pressure; vision of this eye still better than it was before the operation, but not so good as it was just after it. Skin and pulse natural; bowels open. Directed leeches to temples, and mercurial and anodyne ointment around orbits; rest in bed in a moderately darkened room.

8th. Slept little last night. Complained of increased pain in right eye, and around the orbit; complains also of "soreness" *over the whole scalp.* There is now only very slight anæsthesia on right side of forehead, and that on the left side has not increased. Directed *emplast. lyttæ post dext. aur.* Anodyne at bedtime.

9th. In the early part of the evening the pain became much aggravated, extending over the forehead, scalp, and *right side* of the face; the right cheek also, over the lower jaw, became swollen, and tender to the touch. The pain was repeatedly relieved by the *tinct. aconite.* Anodynes rejected by the stomach. During the night, complained of coldness and numbness of the extremities; this was relieved, after a time, by sinapisms, and she slept during the latter part of the night. This morning, feels tolerably comfortable. Pulse and skin still natural. Has now no uneasy sensations in the left eye, and vision with this eye nearly perfect. The anæsthesia on this side has also nearly disappeared. The pain in right eye and around orbit increased; vision about the same. The tumefaction about the lower jaw still exists to some extent. Continue treatment.

11*th*. Was called to patient last evening, and found her apparently suffering greatly with neuralgic pains in the face, neck, and chest; the slightest pressure on the integument aggravating the pain. The pain in the back of the neck is described as being the most severe; and there is inability to flex the head; jaws swollen slightly, and spasmodically closed; skin hot, pulse frequent; some difficulty in micturition; had vomited several times; complained also of her hands being asleep. Ordered sinapisms to feet; tinct. opii camph. with valerian *pro re nata*. This morning is quite comfortable. Fell asleep after one dose of the medicine, and rested quietly. Pain in the eye much abated; no pain elsewhere; skin pleasant, pulse natural.

12*th*. Improving; no exacerbation of pain last night. Can read tolerably fine print with the right eye.

13*th*. Last evening was again attacked with the neuralgic symptoms; temperature of skin not much increased; pulse slightly accelerated. Applied the aconite, and gave one dose of the antispasmodic mixture, when she fell asleep. Tongue much furred; is quite feeble; has a voracious appetite, but is not indulged. Chicken soup, with farinaceous food. ℞. Hydr. submur. gr. v hor. s.; ol. ric. mane; quiniæ sulph. gr. i ter die.

14*th*. Better; "quite well" *she* says. Has been moving about the house, against orders. No pain in eye. Directed some meat, and quin. sulph. gr. v, at 2 o'c. to ward off another paroxysm. Hor. som. hydr. c. creta gr. v; ol. ric. mane.

15*th*. Had a slight exacerbation last night; complained of pain in the right eye, but it extended no further. Eye looks perfectly natural, with the exception of slight injection of the *sclerotica*, which is fast disappearing. Some *asthenopia*, and increased lachrymation.

17*th*. Last night had another violent attack of pain in the eye, but no other neuralgic symptom. The quinia was omitted by mistake yesterday afternoon. The eye looks much worse, and vision is much impaired. ℞. Leech to Schneiderian membrane.

19*th*. Doing well; repeat leech.

21*st*. Eye now appears to be normal, but is weak. Continue quinia and wear a shade over the eyes.

30*th*. Health improving; vision perfect; pupil acts well.

December 14. My little patient called on me to-day. Seems quite well; the eyes have a perfect appearance, but she has, with the right, *visus dimidiatus*. Lost all traces of her after this date; heard that she had removed to Philadelphia.

Taken in connection with the above, the following cases, reported in 1842–43 in the *London Medical Gazette*, by the late Dr. W. C. Wallace, a skilful and well-known oculist of New York city, which I take the liberty of transcribing entire, are extremely interesting:—

CASE II. Patrick Burns, 35, stonecutter, on the 8th Oct. was attacked by several men, knocked down, and wounded over the right *foramen infra-orbitarium*. The wound gave so little trouble that in two days he went to work. Ten days after, the vision of this eye became indistinct; and, imagining that the dimness was occasioned by the scab, he picked it off, though without the least improvement. He was soon obliged to abandon work altogether. The sight of the affected eye became so obscure that he could not make out an object; though, when the hand was passed across the eye, he could tell that there had been something before it. On the 13th November, when I first saw the patient, I dissected out the cicatrix, which was unusually prominent; and, on cutting it

open, I observed in the centre *a small piece of steel.* R. Strych. gr. vj: alcoholis ℥ij: acid. acet. ʒss. M. Fricentur tempora m. et n. Pil. cal. et colocynth. 17th, wound nearly healed, and vision much improved. He can now see the fingers held before the eye. He can, but with much difficulty, distinguish large letters, and expresses himself as relieved of uneasy sensations about the side of the head.

CASE III. John Williams, 25, butcher. On the 8th of November, during an election riot, received, from an unknown weapon, a wound on the right lower eyelid, *below the edge of the orbit,* and midway between the *foramen infra-orbitarium* and tendon of *orbicularis palpebrarum.* According to his own account, *both eyes immediately became blind,* and he had to be led home. As, on the second or third day, the vision of the right eye was perfectly restored, he thinks that the temporary deprivation of sight was caused by the tumefaction of the lids. Since the injury, the *left* eye has been completely amaurotic. With this eye he cannot recognize the least ray of light, and is even insensible to the glare of a magic lantern. The iris is somewhat expanded, and totally immovable when the other eye is closed, but when both are open, their motions perfectly correspond. With the exception of the cicatrix under the right eye, and the total loss of vision in the left, there is no appearance of disease. With great difficulty I persuaded the patient to allow me to remove the cicatrix, which was found *to contain a small foreign body.* But, by no entreaty could I persuade him to allow me to bring the edges of the wound together by stitches. Although he promised to return, he never afterwards made his appearance, and I have not been able to find any traces of him.

Happening to mention these cases to the late Dr. J. Kearney Rodgers, then one of the surgeons of the New York Hospital, and one of the founders of the New York Eye Infirmary, he related a case in point, which had fallen under his own care. The notes of this case I have unfortunately lost, and cannot therefore give its very interesting history with accuracy; but, as I now remember it, the substance was the following:—

CASE IV. A little girl, five or six years old, the child of a friend of the doctor, was playing under a table; and, on rising up suddenly, struck her head against the edge of the table. Some time after this it was noticed that vision of one eye was becoming very imperfect, and Dr. Rodgers was consulted. The blow on the head was not, at that time, considered by the parents as having any connection with the disorder of vision, and was therefore not mentioned. But the doctor, on running his hand over the head of the child, in examining the eye, noticed that she flinched when he touched a particular spot of the scalp; and the mother then said that, in combing the hair, the child often cried when the comb came in contact with this spot, and then related the history of the accident. On closer examination a cicatrix was discovered, and was excised. After the wound had healed, vision was either much improved, or rendered perfect, I cannot distinctly remember which. But the doctor regarded it as a remarkable circumstance.[1]

[1] These cases, and others which will be alluded to, bear out one of the conclusions arrived at by Doctor Skokalski in his investigations concerning the functions of the fifth pair, viz., that "sight does not depend solely on the retina, but on a combined action of the retina and fifth pair." Comparative anatomy also furnishes us with the important fact that, in some animals, whose visual apparatus is but slightly developed, the optic nerve is wanting entirely, and its place supplied by a branch of the fifth pair; as in the mole tribe; but most unequivocally, in the *proteus anguinus.*

Remarks.—Hippocrates remarks, "The sight is obscured in wounds inflicted on the eyebrow, or a little higher" (Middlemore). Beer makes a similar observation, and relates several cases in support of his opinion. He says that "he has had frequent opportunities of accurately observing and curing *amblyopia* and *amaurosis*, occurring in consequence of wounds of the eyebrows." Also, that "where such wounds are judiciously managed, and speedily healed by adhesion, no bad consequence ensues; but when suppuration occurs, followed by the granulating process necessary for secondary union, the divided nerves are involved in the inflammation, and subsequently included in the hard cicatrix, and, as he conceives, compressed and irritated."[1] Larrey seems to have had the same idea, for he says, "In incisions about the orbit, we should avoid, as far as possible, injury of the ramifications of the frontal nerve; or, if we injure it, we should be careful to make a complete section." And, as Middlemore remarks, "few surgeons have had a greater extent of experience in this particular form of injury." Middlemore himself records a number of interesting cases of amaurosis from orbital wounds; though he appears to be somewhat sceptical as to whether it should in general be attributed to the lesion of the nerve. He says, "Amaurosis may arise during the period of dentition; it may take place from the irritation of a carious tooth; from laceration, or other injury of the supra-orbitary nerve." He relates a case in which Mr. Howship removed an encysted tumour from the scalp, which produced "*marked and permanent improvement in vision.*" Another case, in which M. Demours removed a tumour from the neighbourhood of the eye, and thus *produced* amaurosis. Another from the *Edinburgh Medical and Surgical Journal*, "which would appear," he says, "to prove that wounds of the *infra-orbitary* nerve may *restore* the sight of an eye which has long been lost from an amaurotic affection." "A man was affected with perfect *gutta serena* of the right eye, and had the sight of the eye restored, he thinks, *in consequence* of receiving a smart blow in the neighbourhood of the infra-orbitary nerve of the right side of the face." Another still more striking case, in which a person received "a wound just above the right eyebrow from a piece of glass, which was removed immediately after the accident." When the wound had healed, "the sight of the right eye was very nearly lost; he had a painful sensation in the neighbourhood of the cicatrix, and a singular sense of creeping, and pinching and quivering of the upper eyelid and the integuments of forehead." "I made a free incision of the cicatrix down to the bone, and all uneasiness at once ceased, and the eye, shortly after, assumed its healthy character and functions, and *vision was permanently restored.*" Lawrence, after relating two or three cases of amaurosis following wounds and the formation of cicatrices over the brows, remarks, "It is still a matter of doubt whether injury of the frontal nerve may cause

[1] Lawrence, American edition, 1854, p. 124.

amaurosis." And yet, he adds, "injury or other irritation of the trigeminus may bring on impaired vision or amaurosis." "The sympathy between the trigeminus and the immediate nervous apparatus of vision affords the only explanation of some apparently obscure cases, in which amaurosis seems to have depended on a carious tooth, or on some other local affection seated in the head." (Op. cit., p. 578.)

The following remarks by Marshall Hall were reported in the *London Lancet* for 1837–38. "These experiments," alluding to those made by Magendie, "are not the only evidence we possess of the influence of the fifth pair on vision." "In an interesting case under my own care, a partial amaurosis of the right eye has arisen apparently from the caries of the upper canine tooth of the right side." It was *augmented* by unsuccessful efforts at extraction. It has not ceased, however, since extraction was effected. "These facts," says he, speaking of this and other cases, "with the similar results from wounds or tumours of the supra-orbitar branch of the fifth, appear to me to confirm the extraordinary experiments of Magendie." Hennen says,[1] "I have met with one or two cases of amaurosis from wounds of the supra-orbital nerve." "Scarpa," he says, "doubts of the possibility of the cure of amaurosis from this cause, and mentions Valsalva's case as the only one on record. Mr. Hey, however, states another in the *Medical Observations and Inquiries*, vol. v. M. Larrey mentions another, Vicq d'Azyr, who gives a case of amaurosis from a wound of this nerve, in the "*Histoire de la Société Royale de Médecine*, Année 1776," says he has "since divided this nerve in quadrupeds, but without producing any such effect."

That defective vision may result as the direct consequence of irritation of the terminal branches of the fifth pair may also be inferred from the effects of remedial applications to these nerves, and from the phenomena observed to follow irritations and injuries of other branches not so immediately connected with the eye. Some of these instances it will be proper to mention. A friend of the writer, a distinguished surgeon of New York city, was incapacitated for business by violent neuralgia of the face; after having suffered some time with it, he noticed that one of his molar teeth was defective, and went to a dentist to have it examined; not supposing, however, that it had any connection with his neuralgia, since it gave him no pain; its removal was advised; the operation was scarcely over before the doctor experienced complete relief from his excessive pain. "I felt," he said, "as if I could have shouted for joy." A lady, a short time since, applied to me to extract a tooth for her little daughter, which, she said, had been causing her excruciating pain day and night; but, on examination, I could discover no defect; and prescribed some anodyne remedy, which gave only temporary relief. A dentist was called in, who also de-

[1] Principles of Military Surgery, 2d Edin. ed., p. 346.

clined extracting a sound tooth; but on a second visit, and a closer examination, detected an unsound tooth at some distance from the offending one, and extracted it. The pain instantly ceased, and did not recur. Mackenzie relates a remarkable case in point. A man had violent neuralgia of the eye, soon succeeded by amaurosis, and continuing, notwithstanding various treatment, from the autumn of 1825 until the beginning of 1827. At this time M. Galenzowski, to whom he applied, "found vision of the left eye lost and the pupil dilated. He extracted a decayed tooth from the left upper jaw, and, to his astonishment, and that of the patient, found, attached to its root, a splinter of wood, supposed to have been originally attached to a toothpick of wood. *Nine days after, the patient had entirely regained his sight.*"[1] Mackenzie relates another equally remarkable case, occurring in the practice of Doctor Van Zandt, of St. Louis, "of a young man affected with complete amaurosis, excited by the persistence of two deciduous teeth. *As soon as they were extracted* the patient looked up as if terrified, and *found his vision restored.*" "Morgagni, Notta, Deval, Tavignot, and others," says M. Echeverria, "have known amaurosis to be caused by neuralgia, and to disappear *as soon as* the neuralgia was cured." (The Italics in the above references are my own.—L.) Such cases as these might be multiplied, but it is scarcely necessary.[2]

As regards the illustrative effects of the application of remedies above alluded to, I will adduce the following case:—

Soon after the occurrence of Case I, I was led to try the effect of the application of electricity by induction to the orbital branches of the fifth pair for defective vision, apparently not depending on internal disease of the eye (the ophthalmoscope had not then come into use). An old sailor in one of the upper wards of the south building of the N. Y. Hospital, had recently become so amaurotic that he was unable to distinguish anything but large objects about the room. I applied the poles of the apparatus to the supra and infra-orbital branches respectively, and continued the application for near half an hour daily. After two or three days, he noticed improvement of vision; could distinguish a stovepipe hole in the wall, which had before been invisible to him. Subsequently he could read the large type on the cards hanging on the walls; and eventually the large type of a book.[3]

Dr. Addinell Hewson, lately of Wills' Hospital, published a year or two since a number of cases of complete relief of the most intense photophobia, by one or two applications of electricity to the orbit; he alleges almost invariable success. In this connection I will quote the following paragraph from a lecture by M. Echeverria, published in the *American Medical Times*, for May, 1861: "In applying electricity to the eye, you should always be aware of the nature of the current to be employed." "An unfortunate accident happened to the celebrated Duchenne de Boulogne, who, not know-

[1] Archives Générales de Médecine, tome xxviii. p. 261. Paris, 1830.

[2] [For other cases see Lawrence's Treatise on Diseases of the Eye, edited by Isaac Hays, M.D., Philadelphia, 1854, pp. 616–618.—ED.]

[3] Magendie proposed galvanism for the amaurosis succeeding injuries of the orbit.

ing the effect of the *continuous* current upon the optic nerve, applied it to a patient afflicted with paralysis of the facial, and caused the already mentioned mischief (loss of sight)." I have, however, in one case applied the continuous current daily, for two or three weeks, to the orbital nerves for weakness of vision, with good effect.

Since writing the above, my attention has been called to a report of cases treated at Wills' Hospital, for Diseases of the Eye, in 1839, by the editor of this journal,[1] from which I quote the following extracts, as bearing on the effects of injury of the supra-orbital nerves, and on the effects of the galvanic current. It will be observed that Dr. Hays' experience agrees with my own with regard to the effect of the continuous galvanic current.

CASE. *Imperfect Amaurosis of Right Eye from a Blow—Partial Recovery.*—Abraham Corbit, 41, admitted Oct. 5, 1839. Nine days ago, whilst splitting wood, a piece flew up and struck him on the right eye. He experienced little or no pain from the blow at the time, nor did he suffer any subsequently. Seven days after the accident he was quite blind in the right eye. Appearance of eye perfectly natural. Patient had a variety of local and constitutional treatment with varying success. Finally, galvanism was tried by Dr. Hays with some improvement. Patient then left the hospital, but returned afterwards in a worse condition. "The treatment, to which he was now subjected, consisted in the frequent use of galvanism, with the addition, after a few days, of strychnia, conveyed into the system by the galvanic current," with some other adjuvants. "By these means," says Dr. H., "his sight improved." He was subsequently discharged relieved.

The following interesting *observations* are appended to the case by Dr. Hays.

"Whether the amaurosis in the present instance was the result of concussion of the retina, or of injury of the supra-orbitar branch of the fifth pair cannot positively be determined, as it was impossible to learn from the patient whether the blow was directly on the eye or on the brow, the injury being so slight as not to have attracted much attention at the time, and the blow had left no mark.

"The remedy which was most useful in this case was unquestionably galvanism. We have an evidence of this not only in the improvement which followed its application, but in the still more striking fact, that the *patient actually saw better whilst subjected to the galvanic action.* On the 6th of December, whilst the galvanic current was passing from the mastoid process to the superciliary ridge, I requested my intelligent friend, Dr. John Neill, to hold before the patient some letters, and I asked him if he could distinguish them: he replied, 'I see better than I could.' The galvanic current was then interrupted by disconnecting one of the wires from the plates, and which was done without the patient's knowing our object. The letters being still held up, the patient in a minute or two requested the letters to be held nearer, then farther off, and finally he observed, 'I do not see as well as I did just now.' The connection being again made, the patient almost immediately and with apparent surprise exclaimed, 'I see better, again.' The patient was not aware of our object in this experiment, and though of course he must have been sensible of a difference in the effect,

[1] See number of this Journal for August, 1840.

still he did not know, as the poles were all the time applied to his head, that he was at times freed from the action of the apparatus.

"In a case of a similar kind, that of Joseph M. Sutter, a carpenter, æt. 43, admitted October 18, 1836, a complete cure was effected by galvanism. This man trod upon a log, which tilted up and struck him over one eye. When admitted he had complete amaurosis of that eye. Various remedies were employed, among others moxas, with little benefit. I then resorted to galvanism, the very first application of which was productive of marked improvement, and its employment for an hour, two or three times a week, for five weeks, effected a complete cure. He was discharged January 3, 1837, well.

"In Sutter's case, and also for Corbit when he was the first time in the house, the galvanic apparatus employed was a Cruickshank's battery of twenty pairs of plates one and a half inches square. Subsequently for Corbit we used one with fifty pairs of plates three inches square. When this was in full activity it was too powerful for our purpose, and only half or two-thirds of the plates were usually employed. The connection was made by means of leaden wire conductors, to one end of each of which were soldered a slip of copper, and to the other a hemisphere of brass, the flat surface of which was filed into grooves crossing at right angles, so as to form a number of sharp points. Over these were tied thin disks of sponge, which were kept moist with a solution of common salt. When we desired to introduce the strychnia into the system we moistened the sponge attached to the negative pole, and sometimes both, with a solution of this substance. That the strychnia may readily be conveyed into the system by this means is shown by the experiments of M. Fabre-Palaprat (see this Journal for February, 1834, p. 561), but also by the fact that usually much greater twitchings of the muscles were observed when the solution of this substance was employed, than when the sponge was wet merely with the solution of common salt. When the whole force of the battery was not wanted, instead of placing the slips in the extreme cells, they were placed in cells more or less remote, according to the power required; thus the force was easily regulated.

"We are persuaded that properly employed, galvanism is a valuable and effective remedy for certain forms of amaurosis.

"We tried electro-magnetism, in several cases in the hospital during our service in 1839, and also in private practice in a number of cases, but we are not sensible of its having been productive of the slightest benefit in a single instance. From this it would appear that, for remedial purposes, a regular and constant galvanic current is more useful than the violent shocks produced by interrupted currents, as induced by the electro-magnetic apparatus. A Daniell's battery would probably therefore be the best apparatus."

As regards the effects of *disease* of the peri-orbital region, alluded to in the preliminary remarks of this paper, it has been noticed that cancerous and other ulcerations have been followed by amaurosis, whether dependent on reflex *disease* excited within the eye, or reflex *irritation*, as in some of the cases of cicatrices and tumours referred to, could not have been determined without the aid of the ophthalmoscope.[1] In some of the cases

[1] The good effect of the free application of tinct. iodine to the forehead in photophobia is probably not so much due to mere counter-irritation as to a stimulating effect on the filaments of the supra-orbital nerves.

recorded or referred to in this paper the injury has evidently been too trivial, that is, too little violence has been inflicted to produce *concussion* of the eyeball or brain; we can then only look to inflammation developed within the eye, and consequent effusion between its coats, or to reflex *irritation*, as the cause of defective vision. We consider that we are justified in referring to irritation as the cause, when we have, as in Case I, and in Dr. Van Zandt's case, improvement of vision following *immediately* upon the removal of the foreign body; but the ophthalmoscope has now furnished us with more positive evidence. In Dr. Noyes' case, the patient was a physician; a blow on the orbit, apparently not injuring the eye at the time, was followed by total blindness, and by partial anæsthesia of the parts supplied by the supra-orbital nerves. Subsequently the normal sensation returned, but the vision did not. A thorough ophthalmoscopic examination by Dr. Noyes revealed perfect integrity of every portion of the internal structure of the eye. In his concluding remarks, Dr. Noyes says, "The loss of sight was the direct result of the blow, it was immediate, it was total. No cause appears to explain it save injury to the supra-orbital nerve; yet, how to connect these facts understandingly is certainly very difficult." It may be, indeed it has been repeatedly objected to the theory of reflex irritation accounting for this phenomenon, that we see a great variety of wounds and cicatrices in various situations around the orbit, and yet seldom see any disturbance of vision in connection with them. "It is well known," says Mackenzie, "that every wound of the branches of the fifth pair does not produce amaurosis." This is undoubtedly so. Since my attention has been specially directed to this subject, I have noticed numbers of instances of well-marked cicatrices about the orbit not attended by impairment of vision. We know equally well that an immense majority of punctured and contused wounds of the hands and feet are not followed by *tetanus;* yet, occasionally a very trivial injury of these parts *is* followed by tetanus and death, and the wound is none the less regarded as the *cause* of the tetanus, because it fails to succeed so many similar injuries. We also are aware that hundreds of stumps, after amputation, heal without subsequent trouble; but that, nevertheless, nerves are sometimes so implicated in the cicatrix as to give rise to such intolerable neuralgia of the stump as to necessitate reamputation.

There are several features in the rather remarkable history of Antoinette H. which require some notice before concluding this article. It was objected by a very distinguished oculist, to whom the case was related soon after its occurrence, that the wound, being on the *left* side, the amaurotic symptoms should have affected the left eye, and not the right. But, this is not more remarkable than that disease in one tooth should occasion a violent toothache in another perfectly sound; or that irritation of the nerves of the stomach by acidity should induce violent neuralgia of the supra-orbital nerve; or that an irritating application to the mucous surface of the eyelid

should determine also an immediate irritation of the Schneiderian membrane, succeeded by violent sneezing; or that simply touching the *membrana tympani* with a probe should sometimes give immediate relief to a toothache. We see, moreover, that in other cases, the same phenomenon has been observed as in one of Dr. Wallace's cases. We notice, also, that pressure on the wound caused pain, not in the left but in the right eye, which was also aggravated during the steps of the operation, and materially mitigated after its completion. Perhaps the most striking feature of the case was the *immediate* though not complete relief of the amaurosis by the abstraction of the foreign body. She instantly exclaimed, "Now I can see with it," though suffering from the smarting of the wound. This fact, taken in connection with the subsequent history of the case, the frequent subsidence of the symptoms, and their sudden return, without any obvious cause; the violent train of neuralgic symptoms which ensued, the extension of the "numbness" to the left side of the face, and the coincident affection of the left eye; the rapid and simultaneous subsidence of both symptoms, together with the occurrence, months afterwards, of *visus dimidiatus*, is worthy of particular notice.[1] I would also call attention to the periodical character which the symptoms for a time assumed; the exacerbations occurring on alternate nights, and finally yielding to quinia; likewise to the violence of the neuralgic symptoms, simulating at one time *tetanus*, in the rigidity of the muscles of the jaws, the spasms of those of the back of the neck, and their aggravation by attempts to flex the head on the chest, thus developing a *quasi* opisthotonos. Such phenomena are not unparalleled in such injuries. Camerarius relates a case where a slight wound near the outer canthus of the eye was followed by alarming symptoms, among which was temporary hemiplegia. And various writers, as Desse, Morgagni, Petit, record cases in which the most severe symptoms, in one or two instances resulting in death, followed apparently trifling injury about the orbit. As regards the intermittent complications, the following case, which can only be alluded to in general terms, is *apropos*. A very distinguished politician, who is just now attracting considerable attention, became affected, a few years ago, with violent ophthalmia of one eye; the suffering was severe, and the symptoms increased notwithstanding the most assiduous medical attention, resulting in ulceration of the cornea, and even threatening the life of the patient. At this time, a physician at the south, who had formerly treated the patient, hearing of his critical condition, wrote to his medical attendant to try quinine in full doses: this was done, and very soon an improvement was manifest; the inflammatory symptoms subsided, and the patient recovered, but of course with the loss of vision, and some deformity of one eye. As bearing on this case, I quote the following para-

[1] It is worthy of note that an older sister of the patient has total amaurosis of one eye, which resulted from a fall on the head.

graph from Todd and Bowman's *Physiological Anatomy*: "The study of the pathological conditions of this nerve illustrates its physiology in a highly interesting manner. Frequently the branches of this nerve, in greater or less number on one or both sides, may, according to the humoral view, form a focus of attraction for a morbific matter generated in the blood, in persons exposed to the paludal poison, or in persons of rheumatic or gouty constitution; in these cases, as in most others of similar pathology, the neuralgia occurs in paroxysms of greater or less severity, each paroxysm being followed by a period of convalescence, which lasts, it may be supposed, until the morbid matter has been again accumulated in sufficient quantity to induce a high degree of irritation of the nerves."

In my case no miasmatic development has previously been noticed, nor had she been exposed to paludal poison.

COLD SPRING, April 18, 1862.

ART. V.—*On Burns.* By JOHN ASHHURST, Jr., M. D., late Senior Resident Surgeon to the Pennsylvania Hospital.

THE occurrence in our city, at an interval of only six months, of two such terrible accidents as those of the Continental Theatre, in last September, and of Jackson's cartridge factory, in March, has drawn attention in the profession more strongly than for a long time before to the treatment of burns, avowedly the worst class of cases in surgery.

As from my official connection on both of those sad occasions with the Pennsylvania Hospital, in which institution a large number of the sufferers were received, my experience in these accidents has been larger than falls to the lot of many surgeons, I have thought it might not be uninteresting to make some short remarks upon the nature of such injuries, and the mode of treatment which has in the hospital been found most efficient.

No cases demand more urgently immediate and judicious treatment than burns, and yet perhaps in no cases are more ignorance and incompetence shown by too large a number of medical men. I shall not attempt systematically to discuss the pathology and symptoms of burns, but shall glance rapidly at the indications and modes of treatment.

And first, the burn is to be looked upon as a constitutional more than a local affection. The first question should be, does the sufferer feel cold; and his pulse and respiration should be carefully observed. Put the patient instantly to bed and cover him with as many blankets as can be obtained; give him quickly a moderate amount of stimulus and a decided anodyne, such as sixty drops of laudanum with an ounce of brandy. The first danger

is from shock: of ten patients received into the Pennsylvania Hospital last September from the fire at the Continental Theatre, six died within twenty-four hours and from shock; some having never reacted, and some after partial reaction sinking again with frightful rapidity. And when this secondary shock comes on, the patient will, as far as my experience goes, certainly die.

Do not be in a hurry to dress your patients before attending to their constitutional treatment; remember that they will perish from shock if reaction be not obtained, and that they will bear the necessary exposure of having their wounds dressed much better after reaction, than while in the shivering almost collapsed state in which you will probably find them when first called.

Brandy and opium are the remedies most to be relied on in the treatment of burns. Brandy should be given in the form of milk-punch in preference to being mixed merely with water, as furnishing digestible food at the same time with the stimulus, and being less likely to intoxicate than when given in the native state. If you should be so unfortunate as to make your patient drunk, or as is very apt to be the case if your patient is drunk when brought to you, promote reaction as much as possible by external stimulation and use only the more diffusible stimulants internally, especially the preparations of ammonia. Carbonate of ammonia in doses of five grains, made into an emulsion with gum and sugar, may be advantageously given as often as every half hour, and is probably the best of the ammoniacal preparations. In an emergency the aromatic spirit of ammonia in doses of half a teaspoonful, or even the common hartshorn mixed with sweetened water may be used. The amount of stimulation which is well borne and even necessary in these cases is surprising. For weeks and weeks I have given patients two ounces of milk-punch containing one-third brandy, every hour day and night, making a pint of brandy in the twenty-four hours, and this to delicate women and perfectly sober men. Large doses of opium are also required. I generally give as much as half a grain of the sulphate of morphia every six hours. Almost every one of the twenty-two cases which came into my wards on the twenty-ninth of March, had a tablespoonful of the officinal "*Liq. morph. sulphat.*," or thirty minims of laudanum, at intervals of six hours, for many days; and this was no more than enough to quiet the nervous jactitation and restlessness which is one of the most distressing symptoms of burns.

When the surgeon has seen to the general condition of his burnt patients, and not before, he may properly inquire as to the extent of their injuries. And upon this must in a great degree his prognosis be formed.

If half of the surface be involved, no matter how superficial the burn may be, or how good may be the patient's condition, he will almost surely die. Even a burn of one-third of the surface, if it be over the trunk, will almost necessarily prove fatal. And in no case should a recovery be cer-

tainly predicted, for burns are not only the most mortal, but the most deceptive injuries the surgeon is called upon to treat.

Only a small portion of the surface is to be dressed at once, and it is well to have some systematic mode of procedure. I usually dress the arms (for they are almost always involved) before any other part, then proceed to the body, and dress the face last: this is important, as the dressings cannot be applied as closely to the face as to other parts, and are apt to fall off and require renewal during the changes of position necessary for securing the dressings to the chest or back.

The material generally used at the hospital as a primary dressing is the "carron oil," consisting of linseed oil and lime water. This is the most convenient application; its results are I believe as good as can be obtained from any other, and in my practice it has been found far more soothing than anything else I have made use of.

The zinc paint is a good dressing, but requires to be frequently renewed, as it becomes dry, and is then very irritating. It is made by incorporating the oxide of zinc with linseed oil, and is applied by means of a brush. Kentish's ointment I have used, but do not see any advantage it possesses over the carron oil, while it is not nearly so comforting to the patient, and is more difficult to be procured when the emergency suddenly arises.

I have also painted burns with the solution of lunar caustic, as recommended by Mr. Skey, but have not observed that the sensibility of the parts so treated was diminished by the application.

I therefore decidedly recommend the "carron oil" as the best dressing with which I am acquainted. If linseed oil cannot be obtained, good lard oil will answer nearly as well: the oil forms a bland, soothing, not easily evaporating coating to the sores, while the lime water is unirritating, and yet furnishes just enough stimulation to save what can be saved and hasten the removal of parts already dead.

The best method of applying the oil is to soak pieces, not more than eight inches square, of patent lint, Canton flannel, or even old linen or cotton goods, in the mixture, and having laid the dressing thus prepared on the parts to be covered, to apply accurately over the whole oiled silk: this prevents evaporation, and at the same time secures much greater cleanliness than can be obtained in any other way.

Should the burn be of the first degree, or even of the second, provided the vesication were not very extensive, I should suppose, on theoretical grounds, carded cotton might be a good application, as recommended by several surgeons, among others, by Dr. Anderson,[1] by Prof. Cooper,[2] and by Mr. Newnham and Dr. Black.[3]

Even in these cases I should be disposed to cover the parts thoroughly

[1] Glasgow Medical Journal, for May, 1828.

[2] Medical Times, December 11, 1847.

[3] Provincial Medical and Surgical Journal, February 9, 1848.

with the carron oil before applying the cotton. Where, however, the parts are more deeply involved, rendering suppuration inevitable, I should very much prefer the dressing by means of patent lint and oiled silk.

Although I have not myself used cotton, I am familiar with its application in the hands of others, and I have not observed from its use the great relief from suffering which Dr. Anderson considers one of its principal advantages. If cotton be used it should be carefully prepared; as met with in commerce it is too apt to contain germs which heat and moisture will develop into maggots, than the discovery of which in a sore I can imagine nothing more loathsome to the surgeon.

The dressings should be retained in place by means of roller bandages, which are more satisfactory in every respect than sticking plaster.

The face should be covered with a mask prepared in the same way, and having holes cut for the mouth and eyes. It is better to keep the cloth over the face wet by frequent reapplication of the oil; but if this cannot be done it may be covered with oiled silk, secured in this case by adhesive plaster, for a bandage around the head is unnecessarily confining.

When the patient is dressed he almost always expresses himself as feeling much more comfortable. He should be encouraged to make hearty meals. Soup, soft-boiled eggs, light meats, such as chicken, are especially adapted to these cases. The bowels are very often constipated at first, and should be opened by mild enemata: in the course of a few weeks, however, exhausting diarrhœa is apt to set in, and must be controlled by injections of laudanum or black drop. Retention very often, and sometimes suppression of urine occurs during the first days. This is particularly to be watched for in women, who from modesty are often prevented from making their wants known.

The most universal accompaniment of burns and scalds is extreme thirst, and from an injudicious gratification of this desire (in obedience, perhaps, to the vulgar impression that water will put out the fire supposed to be lurking in the system) arises one of the most unfavourable symptoms, viz., sickness of stomach. I am in the habit of allowing small pieces of ice to be held in the mouth, or may give small quantities of carbonic acid water; but on no consideration permit more than a mouthful of water to be drunk at once.

When the patient has been comfortably dressed and has sufficiently reacted, he may be considered out of immediate danger if the extent of surface burnt is not too great. The third and the eleventh are often spoken of as being critical days, and certainly death is very apt to take place about these periods from hypostatic congestions and effusions upon lungs or brain, from tetanus or other unavoidable complication. After reaction, if the patient eats and sleeps well, is quiet, and does not vomit everything he swallows, he may be considered as in a very favourable condition. If, on the other hand, he become violently delirious, tossing off the bedclothes, and even

tearing the dressings from his own sores, instantly rejecting whatever he eats or drinks; and thus, while taking no nourishment, exhausting himself in every way, his chances of life are very much diminished.

The delirium of burns more closely resembles that of mania-à-potu than anything else. It is in fact delirium tremens, the trembling delirium, with the same cold clammy sweat, running pulse, incessant motion of the hands and feet, glaring eye, strange and frightful delusions, whispering voice, piercing shrieks, persisting wakefulness, and too often sudden death, which are so sadly characteristic of the drinking mania.

And the treatment is the same: brandy, opium, lupulin, valerian, and the whole category of nerve stimulants; upon these we are to rely as our only means of saving life.

The local treatment in this the second stage of burns must depend on the condition of the surface. And it is most important that the sores should be dressed *as seldom as possible.* Now this is not lazy surgery, but the contrary is meddlesome practice. I have known men calling themselves surgeons dress their unfortunate patients three times in one day, and claim credit for their zeal. This is all wrong; the first dressing should not be disturbed till absolutely saturated with the discharges; after this the harm of exposure entailed by a redressing will be less than that caused by the presence of so offensive a mass as the old dressing has become.

I have generally found it necessary thus to renew the dressing after two days, and thenceforward every other day it will be usually proper to dress our patients entirely anew. I would reprehend the practice of dressing half a patient's sores one day, and half the next; this leaves them always dirty, and yet always exhausted by the fatigue of being dressed. As soon as the slough has come away from any part, I remove the carron oil or whatever dressing has been applied at first, and make use of simple cerate spread upon patent lint. For this may subsequently be substituted the carbonate of zinc cerate, or the unguentum zinci oxidi, according to the nature of the granulations.

In washing burns, after removing the soiled dressings, and previous to applying the clean, great care must be exercised.

The water should be at least at the temperature of the room; better warmer than colder; the room itself should be warm. I always, before dressing a burnt case, shut all the windows and doors and open the register. Care should be taken not to touch the raw surfaces with the sponge used in washing; the granulations are very sensitive and bleed easily. On the other hand, the new skin surrounding the sore should be carefully wiped free from all the discharge which accumulates upon it; for it is important for the patient's health that this skin should exercise as fully as possible its exhalant powers. For the same reason, in applying the dressings no more than the part really sore should be covered, for to cover the new-formed skin renders it useless.

When granulation and cicatrization have begun, it is advantageous at each dressing to stimulate the sores by gently squeezing from a sponge a little whiskey over the healing surface. This is very painful, but if the dressing be instantly applied the suffering is only momentary. In the latter stages of burns of the fourth degree and deeper, the sore presents the appearance of an ordinary healthy ulcer; here touching the edges with lunar caustic in substance is very useful in promoting cicatrization. Of course in this the third stage of burns care must be taken, by the use of suitable splints and bandages, to obviate the unsightly contractions which are apt to follow burns affecting more than the mere surface.

The constitutional treatment during the third stage must be the same as would be proper during any extensive suppuration, from whatever cause. I cannot agree with Kentish in recommending low diet and purgatives during this stage of burns. The best food the patient can get, stimulus graduated according to his condition and the extent of surface suppurating, and the administration of tonics, I think give a much better chance of recovery than the opposite treatment. I generally give ten drops of the muriated tincture of iron with one or two grains of the sulphate of quinia or of cinchonia three times a day, the alkaloid being converted into a soluble preparation by the addition of sulphuric acid. If exhausting night-sweats supervene, I have found advantage in the use of the elixir of vitriol, or the nitro-muriatic acid. Opium throughout is a very valuable remedy, though less required in the later than in the early stages.

The various complications which arise in the treatment of burns and scalds must be met *secundum artem.* Coma, which sometimes occurs in the early stage, of course forbids the use of opium. Tetanus, which coming on in these cases is very apt to be fatal, may be treated with the Cannabis Indica. This remedy I have given with success, in the dose of one grain of the extract every two hours.

Burns are the opprobrium of surgery, and will always continue to be so, under whatever treatment; but I firmly believe the mortality might be much diminished, could the rules which have been impressed upon my mind by sad experience be made equally clear to every practitioner.

I. We must look *first* to the *general* condition of our patient, and only secondarily to the local mischief done; and while many topical applications answer equally well, we must look upon the *constitutional* treatment as all important. Many a poor girl's life has been lost by not having been given enough to eat, and by brandy and opium being withheld, and the stomach deluged with floods of cold water instead.

II. A burn is essentially a disease of depression, not of excitement. Even the violent delirium is but simulative of excitation, and the remedies here again are food, brandy, and opium.

III. There is nothing to be eliminated; no "fire to be drawn out." All

that we have to do is to strengthen nature inwardly, protect her from the assaults of cold air and other enemies without, keep the functions regular, and meet complications as they arise.

IV. Although we know that a large proportion of our cases will certainly die, we must not give up any one till absolutely *in articulo mortis*. But we should never give a positively favourable prognosis in any case, however slight it may appear, until at least the first and second stages have passed by.

V. In no cases is decision more called for than in these: the patient may die while the vacillating surgeon is making up his mind what to do. Act, and act quickly; should our patients recover, their gratitude and thankfulness will amply repay us for our trouble and anxiety; should they die, the consciousness that we have done all that human skill could do, will prevent our making that, to the physician, most dreadful reflection, that to our own ignorance or neglect have the lives of our patients been sacrificed.

PHILADELPHIA, April, 1862.

ART. VI.—*On the Employment of India-rubber in obtaining Continuous Extension in the Treatment of Fractures of the Femur.* By JOHN H. PACKARD, M. D., of Philadelphia. (With a wood-cut.)

So many contrivances for the treatment of fractures of the femur are already before the profession, that it would almost seem as if every possible expedient, every imaginable form of apparatus, had been resorted to. And yet the results obtained are not satisfactory, nearly all surgical writers confessing that an inconvenient degree of shortening of the limb almost invariably ensues. The reason assigned for the occurrence of this sequela, in cases where there is no loss of bony substance, is the contraction of the muscles, which cannot be, or, at least, is not, overcome.

Whole pages might be covered with quotations to prove that this is the great difficulty in treating fractures of the femur. Mr. Syme, of Edinburgh, is, I believe, the only eminent surgeon of the present day who considers extension to be useless in such cases, and his results, as published,[1] are too favourable to be implicitly received as true.

Now when we glance at the vast array of screws, bands, buckles, and other devices for "keeping up extension," it becomes interesting to ascertain why it is that the end is not after all answered. In most cases, if the surgeon is called at once, he can restore the limb to its normal length by

[1] Observations in Clinical Surgery. By James Syme, Professor of Clinical Surgery in the University of Edinburgh. 1861.

pulling upon it, ether being administered if the muscles are very powerful, or are spasmodically contracted. And immediate reduction is probably performed by the great majority of surgeons, notwithstanding the statement of some authors that no change takes place at the seat of fracture for eight or ten days. It would certainly be strange if the muscles, left to themselves, did not shorten, so as to produce, maintain, or increase overlapping of the fragments.

But if the force applied to keep the limb at its normal length were sufficient, and the apparatus did not yield to the tonic or spasmodic action of the muscles, it is plain that shortening could not occur. Whether such an absolutely unyielding tension could be borne by the patient, or whether the necessary pressure would not be too much for the skin, we need not now inquire. As soon, however, as the apparatus stretches in any part to any degree, in just that degree is the extension done away with.

In view of these difficulties, I would call the attention of surgeons to the value of India-rubber as a means of making steady and unintermitting traction, such as is needed in the treatment of fractures of the thigh. My own use of it has been limited to one case, which I will presently detail. Let me first, however, cheerfully acknowledge my indebtedness for the idea to Mr. Barwell, who describes and represents, in his late work on "Diseases of the Joints," an elastic "accumulator" used by him in the treatment of hip-disease.[1]

John E., æt. 18, was playing with some other boys, when he in some way struck his right thigh against the shaft of a wagon, with such force as to break the bone at about the junction of the middle and lower thirds. I saw him an hour or two after the accident, which took place on Sunday afternoon. There was no difficulty in defining the injury, at a glance, from the deformity, helplessness, and shortening of the limb. His temperament, naturally irritable, had been rendered more so by an injudicious bringing up; he was therefore impatient of pain or restraint, and almost any treatment was likely to prove irksome to him.

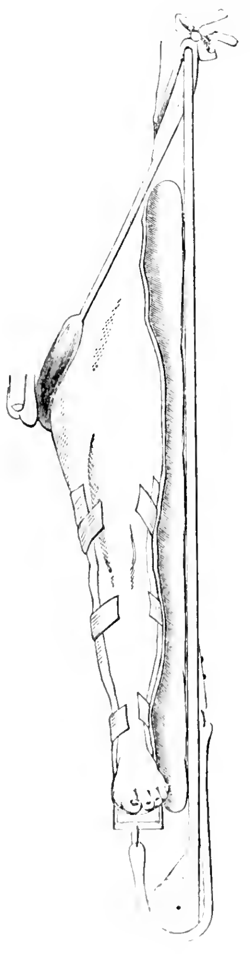
Placing him in bed, I laid the limb on a pillow, and fastened his shoulders to the upper cross-piece of the bed-frame by means of a towel folded cravat-wise and passed under his back, the ends coming up in front, counter-extension being thus made from the axillæ. Extension was made by applying adhesive plaster in the usual way, and then hanging to the bight of the band a couple of flat-irons, weighing together about ten pounds.

No other mechanical treatment was employed for several days, the limb remaining comfortable and in proper position. Meanwhile I had a pair of splints made like those of Desault as modified by Physick, except in the arrangement for extension.

[1] I am aware that Dr. Gurdon Buck, of New York, in describing his mode of treatment by means of a suspended weight (*Am. Med. Times*, March 30, 1861), suggests the use of an India-rubber band passing over the pulley, so as to combine elasticity with the extension; but, with all deference to that able surgeon, I cannot see how any advantage is gained, if the weight is properly regulated, by such an arrangement.

On the inner side of the long outer splint, at its lower extremity, was fastened a solid block of wood, $2\frac{1}{2}$ inches in thickness each way, and as wide as the splint at that part. The middle portion of the block was now sawed out, with the corresponding part of the splint, so as to leave a space for a pulley, the axis of which ran through the middle of each lateral part of the block. This pulley, $2\frac{1}{2}$ inches in diameter, was thus so placed that the extending band would play in its groove.

I had procured, at an India-rubber store, a day or two previously, a "chest-expander," consisting of a round cord of gum-elastic, a little more than half an inch in diameter and about fifteen inches in length, having at either end a handle placed transversely. From this I had had the handles removed, substituting at one end a square, flat piece of wood to be received into the bight of the extending band of adhesive plaster, while at the other end was placed a ring, to which was sewed a small flap of leather. These arrangements will be readily understood by reference to the annexed cut.



Applying the apparatus in the usual way, I brought the India-rubber cord into the groove of the pulley, and drawing upon it until it was, in my judgment, tense enough, I tacked the leather flap to the outer side of the long splint. The boy made no complaint of the severity of the traction upon his limb, although it was if anything greater than that usually made with inextensible bands. From this time forth the muscles were steadily drawn upon, night and day, by the contractile force of the India-rubber; and when he at last got out of bed, he could not, standing on his left foot, perceive any difference between the two limbs in regard to their length. He has now (April 2d) been walking about, first on crutches and then with a cane, for more than eight weeks, and has not the slightest perceptible limp. Accurate measurement is impossible, the muscularity and plumpness of the boy's figure masking the bony points of his pelvis: but as far as the degree of shortening can be estimated, it is a scant half-inch.

The above method, although it seemed to me to answer the end perfectly in the case detailed, might doubtless be improved upon. For instance, it has been suggested to me to substitute a strap passing through a buckle for the leather flap tacked on to the outer side of the long splint. Perhaps it would be as well to let the extending band itself play over the pulley, the India-rubber cord being stretched along the outside of the splint. Another way would be to let the India-rubber cord terminate in a ring at either end (a plain, double loop would answer, if of sufficient strength), the

extending and counter-extending bands being tied, the former to the lower, and the latter to the upper ring.

Whatever plan is used, the surgeon must remember that continuous stretching weakens the gum-elastic. It is better to have a very thick and strong band or cord than a thin one, as in the former case the force can be equally well-regulated, and is far less apt to be weakened by time. The pulley is absolutely essential, unless the extension is direct, which would require a splint of inordinate length. Two or three inches of the India-rubber cord should be free between the adhesive plaster and the pulley, in order to make the elastic force operative.

Besides the usual mode of making counter-extension by the stuffed fillet in the perineum, commonly known as the perineal band, other plans, as is well known, have been proposed. Dr. David Gilbert, of this city, recommends the use of adhesive plaster, applied around the upper part of the thigh. Dr. Hartshorne has invented an apparatus in which a block fastened between the two splints is fitted to receive and bear against the tuber ischii. Other plans have from time to time been brought forward for fixing the upper part of the apparatus against various points in the bony pelvis. Now, the chief difficulty in regard to counter-extension is that of avoiding excoriation from pressure. But, as a matter of course, the elastic element in one portion of the chain would give spring to all the rest, so that any pressure would be made more tolerable. On the other hand, in case of stretching of the adhesive strips, or any other material used for counter-extension, the India-rubber cord should be made so tense as still to maintain its traction on the muscles.

It is probably unnecessary to go into any argument to prove that the weight suspended to the foot acts on the same principle of continuous extension; and, therefore, that this plan may be resorted to when the other is for any reason inconvenient or out of the question. A pulley for the cord to run over is an important advantage, although not essential, when the weight is used.

ART. VII.—*On the Epidemic Relationship of Zymotic Diseases.*

By E. P. CHRISTIAN, A. M., M. D., Wyandotte, Mich.

OBSERVATION seems to have determined conclusively that there exists a certain relationship, or consanguinity, using the word as correctly as in its popular acceptation, between some diseases of an epidemic character. As it regards erysipelas, and a form of puerperal metritis, this relationship seems to amount to a pathological identity; and less determinately, but

with more than plausibility, may arguments be adduced in favour of the same conclusion respecting other epidemic diseases.

Inquiries in relation to the pathology of epidemics, tend greatly towards proving the fact of the unity of zymotic diseases in their origin, or epidemic cause; observation, therefore, becomes not so exclusively directed towards establishing their differential diagnosis, as to studying the generic points of those possessing, apparently, less of family similitude.

Not only has similarity of pathological manifestations challenged observation in some of these diseases, scarlatina and erysipelas, for instance, but so does especially their epidemic relationship, in the uniformity of their sequence and concurrence.

It has been often observed that certain epidemics either prevail together, or follow each other with such uniformity and regularity, that the conviction of its being the result of something more than mere accident is irresistible; that there are indeed definite laws governing these phenomena, and it is more than probable that these laws, when known, will point out to us, not the pathological identity of these diseases, but an identity of epidemic cause: the difference of resulting pathological phenomena, constituting the specific disease, being determined by other intrinsic or extrinsic circumstances.

In confirmation of this statement, I cite the common concurrence of erysipelas and puerperal fever; of scarlet fever and measles; of erysipelas and scarlet fever; the latter with typhoid fever also, and probably with diphtheria too: all as modified forms of the action of the same zymotic poison, or modified zymosis from the same epidemic cause.

Opinions not sustained by facts are of little weight, and we confess to having been impressed, chiefly, by common observation, without having made any large collection of facts bearing on the subject; still we adduce the historical concurrence and succession of epidemic diseases in this vicinity, during the past six months, as confirmatory of this law, so far as it goes, believing that accurate observation will continue to adduce similar evidence.

In August or September of the past year, rubeola appeared in this and neighbouring villages, prevailing epidemically, as it did also near other large sections of country. The general presence in the atmosphere of the zymotic cause was strongly indicated in this neighbourhood by the number of those attacked. Very few of the unprotected population escaped; yet it operated with comparatively little virulence, as out of an aggregate of more than one hundred and twenty cases, not one death occurred that could be fairly charged to this disease; the only two cases in which it so terminated, were both children previously afflicted with chronic ailments, which became so much aggravated as to result in death.

Before Christmas, measles, in an epidemic form, may be said to have subsided, more probably from want of subjects on which to act, than from a subsidence of the epidemic cause, it being never entirely absent from the

village until March, sporadic cases occurring occasionally, in concurrence with other diseases, which we are about to mention.

In December, while the measles was at its height, I was called in attendance on cases of unequivocal and severe diphtheria, in the neighbouring village of Ecorse, distant two miles from Wyandotte; this disease prevailed also, in a virulent form, and quite as extensively. In its outbreak it invariably attacked those who were just convalescent from measles. Not a single case of scarlatina had occurred in the village up to this time, though there were some subsequently, before its entire disappearance.

Just at this time, while in attendance on diphtheria at Ecorse, a virulent anginose affection occurred in Lizzie C——, a child of seven years, in this village, who was just convalescing from measles, and the case bearing every resemblance to those I was attending at Ecorse was pronounced the same. There was not the slightest appearance of an eruption, nor any desquamation of the surface, a fact I mention, because in some which occurred subsequently, where there was no appreciable eruption, desquamation took place during recovery. During the convalescence of Lizzie, a younger sister, also just recovered from measles, sickened, and in three days died, with all the symptoms of unequivocal scarlatina anginosa. Several other children in the same family sickened with well-marked scarlatina, and recovered.

From this family, scarlet fever, of an intense anginose and malignant variety, spread rapidly into those of friends and neighbours, and gradually over a large part of the village, until, by April, an aggregate of more than eighty cases came under observation, with ten deaths, all occurring among very young children. The disease, in its onset, continued to attack those lately recovered from measles, and at first, also, electing those for its victims who had in any way been exposed to contagion from the sick, but eventually seizing upon some who had been most carefully and vigilantly guarded from it, and, on the other hand, strangely passing by those who had been repeatedly exposed.

All through the progress of this epidemic, there were cases of diphtheria occurring occasionally, of a character well marked, and very distinct from the anginose affection of scarlatina, until about the middle of March, this disease may be said to have reached the character of an epidemic also. It prevailed chiefly among adults, or those of fifteen years and upwards, but not exclusively so; the scarlatina as generally selecting children, though sometimes seizing upon adults. In families where the scarlatina prevailed among the children, the adults were especially liable to an anginose affection, varying in intensity in individual cases. The diphtheria attacked those who had had scarlatina in infancy. None passed through the two forms of the disease. The former prevailed most amongst those who had not been exposed to scarlatina, and was as likely to seize upon a single member of a family as upon several, the reverse being the case with scarlatina.

And now I will briefly detail the peculiarities of some individual cases, exhibiting another zymotic element present as an exciting cause, or else showing still other modifications of zymotic disease from the epidemic constitution of the atmosphere.

The following case is cited as a type of many which occurred during the scarlatinal epidemic:—

About the first of February, the babe of Mr. Dewitt, aged four months, sickened with scarlet fever, three older children in the same family just convalescing from the same disease, which they had had severely. In the babe, the enlargement of the submaxillary glands was very great, though not so large as in two of the older children who recovered. It was of an erysipelatous appearance, and instead of the general efflorescence on the surface, there were discrete patches of erysipelatous swellings scattered principally over the limbs. This child died on the second or third day, from the intensity of the blood poison, and not apparently from any local complication.

Februray 16th, I was called to see M. Drunnan, aged twelve. The street on which he lived had been the hot-bed of scarlet fever, over twenty children having had it in a severe form, within a space of three hundred yards. This boy had never had the scarlet fever, but had recently recovered from measles. I found him with high continued fever; great general disturbance of the organic functions; and erysipelas extending from the ankles over a large part of both legs. He recovered by resolution in about ten days. Other children of the family subsequently sickened with genuine scarlet fever.

About the same time I attended Mr. Eva, who had simply run a small splinter into his finger, from which erysipelatous inflammation extended half way up his forearm, and sloughing of a large part of the cellular tissue of his finger took place.

M. Twaddle fell, and struck the back of his hand, not violently, yet erysipelas set in, and sloughing of much of the cellular tissue ensued.

Other cases of a similar nature occurred, not necessary to detail.

In the convalescents from severe attacks of scarlet fever, furuncles and abscesses were common, not merely about the glands of the neck, but in the chest, back, and abdomen. All such cases recovered without any subsequent relapse, as did also those generally in whom the eruption took the form of minute vesicles, covering the scarlet efflorescence like sudamina. These were successful efforts on the part of nature to eliminate the morbific matter or poison from the system.

In proof of the coexistence of still another allied form of disease, I will now detail the two following cases:—

March 3d, Mrs. A. was confined with her fourth child. March 8th, Mrs. H. was prematurely delivered of her first, at the eighth month of utero-gestation. In the latter case there was ample cause for all subsequent developments, from the fact of premature labour having been induced by a fall, and laborious exertion in stowing away a load of hay. The labour was exceedingly severe and tedious, owing to the narrowness of the pelvis; and none but the services of an ignorant midwife were sought until the last stages of labour. The night after the birth of the child she arose from the

bed on the cold floor to administer to the wants of her babe, being unable to arouse her attendant. The next morning I found her with intense metro-peritonitis. She was bled, with entire relief of pain, and reduction of the pulse. In the evening there was increase of soreness again. Leeches were applied, and afforded relief; again the disease lighted up with increased intensity; again bleeding was resorted to; but the patient subsequently died.

On the day of this woman's death, acute metritis lighted up in the first named patient, Mrs. A., being the twelfth of her own confinement. At the same time erysipelas of the integuments about the left eye set in. Leeches were applied, and copious flowing from the bites encouraged for several hours on the lower part of the abdomen, with entire relief of the metritis, and also of the erysipelas.

It is proper to say now, however, that among a number of other parturients about the same time, and some of them under unfavourable circumstances, there was nothing to interfere with their normal recovery.

Now, then, the inquiry suggests itself, is such a concurrence of zymotic diseases, which is not at all uncommon, satisfactorily explained by the theory of one prevailing epidemic leaving its impress on all concurrent diseases, or the epidemic constitution of the atmosphere modifying and impressing the prevalent diseases; or does it not rather indicate a close family relationship, or consanguinity between these zymoses, originating perhaps from the same epidemic cause, and the specific characters of each disease being derived from other, and as yet unknown causes?

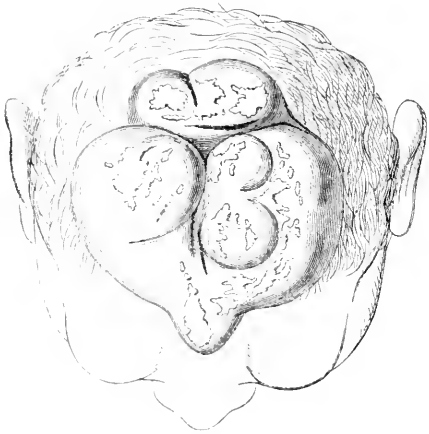
In conclusion, if the marked pathological dissimilarity in these associated diseases is advanced as an argument against the identity of their cause, or more correctly, against an intimate causal relationship, we may cite on the other hand the marked difference of pathological manifestations arising in different individuals, placed under similar circumstances, exposed to the same morbific cause, paludal malaria; the different resulting diseases depending upon a variety of modifying circumstances. In those exposed to the action of this malaria, we may observe the protean forms of miasmatic disorders, as numerous, and more varied than those above enumerated. We see intermitting, remitting, and continued fevers; neuralgias, intermittent and continued, in a single, or a set of nerves, and other phases of nervous derangement innumerable; dysenteries, diarrhœas, and bilious colics; Jaundice, pneumonias, and even cutaneous eruptions, &c. &c. Now is it less rational to suppose there may be a similar unity of origin of those associated epidemic diseases, than of these endemic disorders whose cause, if more appreciable, is certainly quite as intangible.

ART. VIII.—*Description of a Pseudencephalic Monster.* (Genus 11, Thlipsencephalus, Isidore Geoff. St. Hilaire.) By CHRISTOPHER JOHNSTON, M. D., Baltimore. (With three wood-cuts.)

I AM indebted to my friend, Dr. J. Dwinelle, of Baltimore, for the privilege of making the following observations upon a living Thlipsencephalic monster, and also a dissection of the abnormal parts.

A lady in her sixth confinement gave birth to a large, living, male child, robust and well-formed in its other parts, but monstrous in the development of its head, which, strongly bent backwards, was deficient in both bone and natural integument above a line passing over the orbital plates of the frontal, the petrous portion of the temporal, and along the lateral sinuses of the occipital bones. The shallow cranial cavity was occupied by a flat scarlet tumour, $2\frac{3}{4}$ inches in length by $2\frac{1}{2}$ in breadth, varying from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in thickness, and which was lobulated so as to suggest the idea of hemispheres and cerebellum. Fig. 1.

Fig. 1.



The length of the child was $19\frac{1}{2}$ inches, the umbilicus being at 10 inches from the plantar surface; its weight $8\frac{1}{2}$ pounds on the second day of its existence. The testicles had not descended.

It may not be amiss to remark that the mother, an exceedingly amiable person, was peevish and irritable during her entire pregnancy, which she claims to have exceeded the normal period by one month; and that, at about the third month, she received a severe internal injury from a child who leaped with force upon her abdomen.

The fœtus presented normally, and the labour, although somewhat tedious, was not severe. As soon as born, the child moved its limbs and trunk: its respiration was at once established, and it uttered cries which were remarked to be more feeble than those of ordinary children. But, although the circulatory and respiratory functions soon became active, the countenance remained livid, while yet the rest of the cutaneous surface assumed a fresh rosy tint.

The ready movements of the mouth attracting attention, the mother was besought to apply her offspring to the breast; but nothing could overcome her repugnance to nursing "so hideous a monster," whereupon, the nurse essayed successfully to feed the child with sugar and water administered with a spoon.

The birth occurred on the 19th of July, at 11 o'clock A. M., and I first saw it on the 20th, at 6 P. M., in the interval between which hours urine

and meconium had each been voided once. The radial pulsations could not now be counted, but the heart's rhythm was regular and even, and its beatings numbered 160 in the minute. Respiration, 44 per minute; inspiration at times suspirious, but generally *sobbing;* expiration slightly hoarse, yet effected in a single effort. The thoracic and abdominal respiratory movements were full, although somewhat laboured. Temperature of the body cool; that of the face conspicuously so.

The child moved its limbs, and grasped what it touched with the hands. It obeyed the calls of nature, partially closed the eyelids, which presently relapsed into their former half-opened state, but it appeared to be, and doubtless was, unconscious; and the ocular globes, which diverged a little in strabismus, as well as the pupils, remained immovable even when a lighted candle was brought into close proximity to them.

When undisturbed the little creature now made no effort to alter its position; it shrank, however, if flies crawled over its head, and started almost upright whenever the tumour, especially the posterior part of it, was touched. Yet it is worthy of remark that pressure exerted upon the same part was productive of very inconsiderable effects, although, at the moment of contact of the finger, sensibility seemed painfully heightened.

At the period of my visit mentioned above, the child was reported to have lost much of its energy, but it could still practise suction upon a finger introduced into its mouth, and it swallowed a bland fluid which I administered in a spoon; notwithstanding the attendants were unwilling to satisfy the wants of so forbidding a creature. It continued to grow feebler and less livid until about one o'clock A. M. of the 22d (62 hours), when the respiratory act was arrested and renewed several times, and it stretched out its limbs and presently expired.

Appearance of the body nine hours post mortem.—Face livid; tumour had subsided somewhat, and was of a less brilliant color; the rest of the body was of a yellowish hue.

Head.—A careful dissection revealed the following, viz: The three red lobular masses, upon being opened, were found to consist entirely of spongy vascular substance surrounding a considerable number of cysts or loculi containing a dark amber-coloured fluid. Upon removing the remaining portion of the occipital bone, namely, the part below the inner protuberance, and which was entire, laying bare the atlas and dentata, the arches of which were deficient, and cutting away the arches of the other cervical vertebræ, the dura mater was found to be much thickened, and to present the appearance of a network including a serous fluid in its meshes. The medulla oblongata being exposed, the pia mater surrounding it was of a deep-red colour and thickened, and was lost in the tough substance of the tumour. Indeed, like the dura mater just noticed, the pia mater, in this situation as well as in the tumour, which was evidently an abnormal development of this expansion, offered all the characters of an erectile tissue.

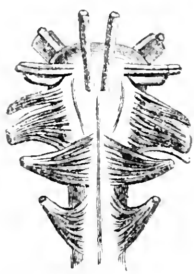
The medulla spinalis was perfectly normal, as was also the medulla oblongata, which terminated the nervous tract anteriorly. There were no hemispheres nor trace of nervous matter in the red lobes, but in the quasi cerebellar lobule a little node or mass as big as a pea was found in a cyst. The pons was absent; but upon the upper extremity of the medulla, posteriorly lay a little roundish mass of nerve-substance of a dark purplish-red colour, measuring $\frac{5}{16}$ of an inch in diameter.

Two semi-fibrous cords passed separately, one from either side of the base of the red tumour, through the optic foramina of the sphenoid, and

represented the optic nerves. But while there was no suggestion of a chiasma or of nerve-matter in the cords behind the sella turcica, it is especially worthy of note that in front of the posterior clinoid processes the cords each contained a little bundle of nervous filaments, which were continued into the orbits. These nerve-fibres were carefully studied with the aid of the microscope, and they corresponded in all particulars to those taken from the optic nerves of a stillborn but perfectly formed child.

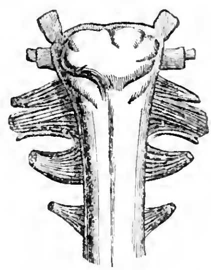
The *first* nerve was wanting; the *second* has just been mentioned; the *third* and *fourth* were also absent; the *fifth* nerve arose out of the outer corner of the extremity of the medulla, which was very red at this point. The Gasserian ganglion and the underlying motor bundle were distinctly recognized, and the three branches of the fifth traced to their foramina of exit. Figs. 2 and 3.

Fig. 2.



Medulla oblongata; Anterior view; Natural size.

Fig. 3.



Medulla oblongata; Posterior view; Natural size.

The *sixth* was perfect in course and appearance, and seemed to be composed of two filaments in one sheath.

The remaining six nerves, and also the cervical spinal nerves, were normal, except that the hypoglossal had a very low apparent origin.

The pituitary "gland," or, rather, a reddish body representing it, occupied the sella turcica.

No farther dissection was allowed.

In reviewing the above statements the reader will at once perceive that the strabismus depended upon the existence of but a single motor nerve in the orbit; for when, animated by the sixth nerve, the external rectus had once contracted, the globe remained everted on account of the total absence of antagonistic power to restore equilibrium.

With regard to the movements executed by the infant, it must be admitted that they were purely reflex and involuntary, for although all the sensitive nerves of the body and head were in normal condition (if we except the absent relation of the fifth nerve to the tuber annulare), the entire cerebrum and pons varolii were wanting, and of the cerebellum there remained only a diminutive rudimentary button fastened down upon the posterior surface of the medulla, which might exert a pronominal co-ordinating influence upon muscular motion. It is true that irritation of any sort applied to the tumour, particularly the posterior surface, which was somewhat chafed as it was thrown back against the pillow, occasioned an

immediate *start:* but we must discriminate betwixt this convulsive effort, in which the *will* could not possibly be involved, and the "endeavour by voluntary movements to escape from a painful irritation, which, as an evidence of sensitiveness to external impressions, is still possible when, after ablation of all other parts of the brain, the tuber annulare and medulla oblongata are respected." In the present instance, Nature had paused at a condition in the human subject which art has striven to reach in lower animals; and that, too, without those embarrassing side consequences with which scientific mutilations are too frequently attended.

ART. IX.—*Cases treated at the Medical Missionary Society's Hospital at Canton, China.* By JOHN G. KERR, M. D. (Communicated by Prof. S. D. Gross, M. D.)

OF the surgical cases presented for treatment at the hospital in Canton, the most important are those requiring operations for the removal of stone in the bladder. There are no statistics to show how common this affection is: but that it is of frequent occurrence may be inferred from the fact that not less than fifty cases are seen annually at the two missionary hospitals in this city.

It is unnecessary to enter into a discussion of the causes which produce calculous diseases; but it may be remarked, as bearing on the subject, that, as tea is the universal beverage of the Chinese, they do not drink water until it has been boiled, and the lime which it contained is thereby precipitated to a greater or less extent. It is a very rare thing for a Chinaman, even of the poorest classes, to drink cold water. In this country, therefore, the disease cannot be attributed to the use of water impregnated with the salts of lime.

It is a remarkable fact that urinary calculus has not been met with in any other part of China than Canton Province. Dr. Lockhart, of Shanghai, and Dr. McCartee, of Ningpo, who have practised among the Chinese for about twenty years, have informed me that they have never met with a case. That the disease exists in other parts of this vast empire is not unlikely, but it remains for future observers to discover the localities.

The first operation for stone in the bladder was performed in July, 1844, by the Rev. P. Parker, M.D., who was the founder of the Medical Missionary Society's Hospital. Up to the end of 1851 Dr. Parker had operated on 30 cases, only two of which were fatal. He had, I think, half a dozen other operations which have not been published. In 1854–56 Dr. W. G. Dickson operated on nine cases at the Medical Missionary Society's hospital. One case was fatal. About 39 cases have been operated on at the Hospital of the London Missionary Society in this city, of which nine have died. The operators were three English surgeons and one Chinese surgeon educated in Edinburgh.

Tabular Statement of Cases of Stone in the Bladder.

No.	Age.	Residence.	Occupation.	Duration.	Date of Operation.	Chemistry.	Diameters.	Weight. oz.	d.	s.	Result.	Remarks.
							inches.	oz.	d.	s.		
1	50	Sanshwui	Labourer		May 23, 1856	Uric acid	1 by $\frac{3}{4}$				Recovery	
2	28	Kanming	Farmer	11 mos.	Oct. 10, "	"			1	0	"	Lithotrity.
3	36	"	"	12 yrs.	Oct. 17, "	"	$2\frac{1}{4}$ " $1\frac{1}{4}$	2	1	2	Death	11th day.
4	50	Canton	Shopkeeper	3 "	Nov. 29, 1859	"	$2\frac{1}{3}$ " $1\frac{1}{2}$	1	4	0	Recovery	
5	7	Tungkwan		3 "	Dec. 2, "	Phos. lime	$1\frac{1}{4}$ " $\frac{7}{8}$		2	2	"	
6	17	Nanhai		4 "	April 10, 1860	Uric acid	2 " $1\frac{1}{4}$	1	1	0	"	
7	42	Canton	Shopkeeper	7 "	July 5, "	Oxalic	$1\frac{1}{8}$ " $\frac{1}{2}$		1	0	"	Opium smoker.
8	41	Pwanyü	Carpenter	4 "	July 5, "	Uric acid	2 " $1\frac{1}{2}$		5	2	"	
9	17	Szhwui		3 "	July 27, "	"	$1\frac{1}{2}$ " $1\frac{1}{4}$		3	2	"	
10	35	Shauhing	Labourer	3 "	Aug. 11, "	"	$1\frac{3}{4}$ " $1\frac{1}{4}$		6	$0\frac{1}{2}$	"	
11	51	Tungkwan	"	2 "	Sept. 18, "	"	$1\frac{3}{4}$ " $1\frac{1}{2}$	1	0	$2\frac{1}{2}$	"	
12	28	Sinhwui	Shopkeeper	$1\frac{1}{4}$ yr.	Nov. 15, "	"	$2\frac{1}{2}$ " $1\frac{3}{4}$	1	5	0	"	
13	37	Pwanyü	Tile-maker	3 yrs.	Dec. 4, "	"	$1\frac{3}{4}$ " $1\frac{1}{4}$	1	0	0	"	
14	9	Szhwui		2 "	Dec. 11, "	"	$1\frac{1}{3}$ " $1\frac{1}{8}$		4	2	"	
15	57	Sinhwui	Paper dealer	4 "	Dec. 11, "	"	$2\frac{1}{3}$ " $1\frac{7}{8}$	3	2	1	Death	2d day.
16	33	Heungshan	Farmer	2 "	April 8, 1861	"	$1\frac{3}{4}$ " $1\frac{1}{4}$		5	0	Recovery	
17	61	Fuhshan	Wire-maker	14 mos.	April 8, "	"			1	$1\frac{1}{2}$	"	Lithotrity.
18	29	Tungkwan	Boatman	13 "	May 17, "	"	2 " $1\frac{1}{4}$	1	0	1	"	
19	34	Pwanyü	Farmer	3 yrs.	Aug. 12, "	"	$1\frac{1}{3}$ " 1		3	1	"	
20	47	Tsingün	"	4 "	Sept. 9, "	Phos. lime	$2\frac{1}{2}$ " $1\frac{7}{8}$	2	6	2	"	Opium smoker.
21	21	Pwanyü	Small trader	6 "	Sept. 9, "	"	$1\frac{1}{2}$ " $1\frac{3}{8}$	1	2	1	"	Two stones.
22	30	Nanhai	Farmer	4 "	Sept. 30, "	Uric acid	$2\frac{1}{2}$ " $1\frac{3}{4}$	2	4	0	"	
23	43	Szhwui	Shopkeeper	1 yr.	Oct. 30, "	"	1 " $\frac{1}{2}$		1	0	"	
24	24	Tungkwan	Carpenter	4 yrs.	Oct. 30, "	Triple phos.	$2\frac{1}{4}$ " $1\frac{3}{4}$	2	4	1	"	Encysted.
25	24	Sanhing	Farmer	12 "	Nov. 4, "	"	3 " $2\frac{1}{2}$	5	0	0	"	
26	17	Pwanyü	"	3 "	Nov. 13, "	Phos. lime	$1\frac{1}{8}$ " $\frac{7}{8}$		3	0	"	
27	51	"	Small trader	5 "	Dec. 30, "	Uric acid	$1\frac{3}{4}$ " $1\frac{5}{8}$	2	1	0	"	Two stones.

The above tabular statement includes all the operations for stone performed by myself up to the end of 1861. It will be noticed that no cases occurred in 1857–58. This was owing to the fact that the operations of the hospital were interrupted during those years by the war between England and China.

A few remarks on some of the cases is all that it is necessary to add to the facts contained in the tabular statement. The majority of the patients reside at distances of less than fifty miles from Canton. A few lived farther away, and one or two resided at a distance of about one hundred miles from the capital of the province.

The lateral operation has been performed in all the cases, except two, in which lithotrity was employed. This operation would be resorted to more frequently in suitable cases, but that patients are not willing to stay the length of time necessary for its completion. The stone in Case No. 23 would have been crushed but for an error in measuring it, although this was carefully done before operating. The case was an excellent one for crushing, but the recovery of the patient after being cut was slow and unsatisfactory.

In Case No. 3, the stone was covered with a deposit of crystals, which made its surface very rough. The bladder was no doubt extensively diseased, as the foreign substance had been in the viscus for so many years. There was a large deposit of muco-purulent matter in the urine. Reaction did not take place after the operation, and the patient gradually sank from irritative fever of a typhoid character.

In Case No. 10, the operation was followed by an abscess in the left internal iliac region, the matter from which was discharged at the incision. He lingered for several weeks with but little prospect of recovery, and finally returned to his home, about ninety miles distant. About six months afterward he returned to the hospital, very much improved in health, the abscess having entirely healed, but he still had symptoms of stone. After several careful examinations, a small stone was found in the membranous portion of the urethra, which had formed, no doubt, during his long illness. He declined submitting to any attempt to remove it, and left the hospital. In the beginning of the present year he was met with again at the dispensary in Fuhshan, in the enjoyment of robust health. The small stone had been discharged some months before, and was followed by entire relief of all his sufferings. This man complained of inability to discharge semen, although erections took place as usual.

Cases No. 7 and No. 20 were opium smokers. The appearance of the latter was like that of a man in the decline of life at 60, although his age was only 47. When he first came to the hospital the operation was declined on account of his general debility, and the indications of extensive disease of the bladder. He returned to the country, and, after spending some months in a place more salubrious than his own residence, he came back to

the hospital, with a decided improvement in his general health. The operation was undertaken with reluctance, but finally his urgent requests were yielded to. The stone had three rough places on its surface which were the cause of much irritation of the mucous membrane. One of these rough places was so situated as to be in the form of a jagged hook, and in the extraction was the cause of much laceration of the tissues. Notwithstanding all these unfavourable circumstances, the patient recovered slowly and left the hospital about a month after the operation.

In Cases No. 24 and No. 25 the stones were unusually rough, and had caused chronic inflammation of the bladder, which made the cases very unfavourable. The stone in No. 24 was encysted, or so grasped by the thickened and contracted coats of the bladder that it was almost impossible to extract it, and, after nearly two hours' hard work, I was on the point of giving it up, when, at last perseverance was rewarded with success. The size and roughness of the stone, in Case No. 25, rendered its extraction very difficult, and about one hour and a half were consumed before its removal was effected. In both these cases, great violence was done to the tissues of the perineum, both by bruising and lacerating, and this, added to the chronic disease of the bladder, rendered the recovery of the patients exceedingly doubtful. They both, however, recovered gradually, but slowly, without any serious drawback. When they left the hospital, they were still suffering from chronic disease of the bladder, but there was every prospect that removal to the country would soon result in perfect restoration of health.

The last case, No. 27, was complicated with stone in the urethra, which had caused inflammation and swelling of the penis with ulceration of the glans. This stone was about one inch long, by three or four lines in diameter at one end, tapering to half that size at the other end. After its removal the penis was restored to a healthy state by fomentations, laxatives and other means, and then it was found there was urinary calculus. On performing the lateral operation, two stones, of the same shape and size, were removed, and the patient made a favourable recovery.

No case of calculus in the female has been met with.

With reference to the treatment after the operation, it may be stated that the patient is placed on boards with a thin straw mat—the common Chinese bed—and that these boards are separated three or four inches so as to allow the urine and feces to be received into a vessel below. No dressing was applied to the wound, but frequent bathing with tepid water was practised. Each patient had his own attendant, and but little control could be exercised over the diet. When able to buy it they often took medicine from native physicians.

In one case only was there dangerous hemorrhage, and this happened on the fourth or fifth day, in a patient 50 years old.

ART. X.—*Case of Puerperal Uræmia.* By V. J. FOURGEAUD, M. D., of San Francisco, California.

CALLED upon to attend Mrs. ——, on the 24th of September, 1861, I was informed that she had had several miscarriages, and that her two living children were born before the eighth month. I found her face œdematous, and she complained of loss of sight, so that it was difficult for her to distinguish persons at a few feet from her, and was unable to read printed matter.

Suspecting from these symptoms that she was under the influence of uræmic intoxication, I requested that her urine should be sent to me for examination. Having submitted it to the usual test, by fire and acid, the result confirmed my fears. An albuminous deposit of more than one-third of the quantity of urine submitted to the test settled the diagnosis.

Having informed her friends of the danger of her situation, I placed her immediately under the prophylactic treatment of Braun, hoping thus to avoid the imminent peril attending such cases, and especially convulsions.

On the 27th, I lost all hope for the life of the fœtus, its movements having ceased, and auscultation revealing no fœtal pulsations. Having again auscultated her on the following day, with no better result, I felt satisfied that the fœtus was dead, and so informed her friends.

She was taken with labour-pains on the 1st of October. At that time, although the quantity of albumen in the urine had considerably diminished, the amblyopia had gradually increased to such a degree that she could not distinguish common objects near at hand.

I placed her under a moderate influence of chloroform, whenever the pains would come on, and, after a few hours, she was delivered of a seven months' fœtus, which, to all appearance, had been dead for three or four days. Her labour was otherwise natural, and passed off without convulsions—a circumstance which I attribute altogether to the prophylactic treatment and the use of chloroform.

The following morning, finding that she had not passed water, I relieved her with the catheter. I was then informed that she could not move her legs, and, upon examination, I found her paraplegic. The muscles of the upper half of the body were altogether intact and performed their function naturally. The pulse was rather feeble and excitable. The brain was in a normal condition, the intellect perfect, deglutition and articulation good. The spine gave no indication of pain until coming to the third lumbar vertebra, where pressure was intolerable, there being much tenderness from that point to the extremity of the coccyx—the pain being greater, however, on the lumbar vertebræ. The motor power of both legs was entirely lost, sensibility being but partially impaired. Paralysis of the rectum and sphincters, with involuntary discharges of feces; paralysis of the bladder, with retention of urine; amaurosis, the eyesight being almost entirely gone. Such was the condition of the patient on the 2d of October.

On the 3d there was suppression of the lochiæ (which did not return again), fever and great tenderness and swelling over the abdomen, which continuing for several days, caused me to fear a metro-peritonitis. However, all the inflammatory symptoms and pain gradually subsided under treatment. (Abdomen covered with large linseed meal and poppy poultices; clysters of the same nature. Diet: milk, tea, and dry toast.)

On the 6th, no change in the paralytic symptoms. The urine exhibited a large quantity of mucus, with earthy phosphates, alkaline, highly ammoniacal and so thick and ropy that micturition was often difficult and sometimes quite impossible through the catheter, until the instrument had been cleansed of the secretions which clogged it. Specific gravity of urine 1012. The catheter was used three or four times a day, and the bladder was washed out daily by freely injecting tepid water into it. The spine and lower extremities were rubbed with lin. ammoniæ, and afterwards with the following: ℞. Tinct. nucis vomicæ ℥j; Liq. ammoniæ ʒij; M. pro lin. The infusion serpentariæ, with the addition of quinine, was ordered three times daily; also: ℞. Acid. benzoic. ʒiss; Dec. pareiræ ℥xvj; Morph. acet. gr. ij. M. A tablespoonful three times a day, with five drops of vin. colch. rad. Patient objecting to blister on the spine, stimulating liniments were used. A slight running from the bowels having supervened, it was checked by starch injections with a few drops of laudanum.

18th. No important change in the amaurotic and paralytic symptoms. Electricity was used on this day for the first time, and continued for several days along the spine and legs and over the region of the bladder. The urine was free from deposits and mucus; colour, pale amber, no trace of albumen; reaction, alkaline; sp. gr. 1011.

20th. Sight improved a little, begins to distinguish persons in the room; can move left leg. Bowels are somewhat better under her control, but no improvement in the paralysis of the bladder. The retention of urine persisting, the catheter has to be used. Right leg still completely paralyzed and œdematous from knee to foot. Bandaged it up. Sp. gr. of urine 1012. Colour, pale amber; reaction, acid. No trace of albumen.

Nov. 1st. Her general health continues to improve. Right leg still paralyzed and œdematous. Troublesome cough. Continue treatment; also: ℞. Syr. scillæ, Syr. acaciæ āā ℥j; Tinct. opii camph., Tinct. valerianæ āā ʒiv. M. Take two teaspoonfuls in a little water pro re nata.

22d. Since the first the patient has continued to improve gradually, but steadily. Her eyesight has made such progress that she can now read print. The œdema has disappeared, and the paralysis of the leg is considerably diminished. She can now take a few steps, being supported. Yesterday she passed water for the first time since her confinement, without the aid of a catheter. Urine, clear, amber colour; sp. gr. 1017; no albumen. Her bowels are under her control, and it is only occasionally that she has an involuntary passage of feces. The tenderness over the spine is now very slight. Continue treatment. One of the following pills daily: ℞. Strychniæ gr. j; Cons. rosæ q. s. M. Ut fiant pil. xii.

26th. All the paralytic symptoms much better. Can walk across the room without support. Urine, natural; sp. gr. 1018. Has to use the catheter only occasionally.

The patient continued to improve until the month of December, when the family being about to remove to their country residence, I recommended gentle exercise, the use of sea-water baths, good nourishing diet, with port wine and brandy, and Pil. ferri carb. gr. x daily.

With the exception of an occasional relaxation of the sphincters, under fatigue, when she over-exerts herself in walking, the patient has entirely recovered.

TRANSACTIONS OF SOCIETIES.

ART. XI.—*Summary of the Proceedings of the Pathological Society of Philadelphia.*

1862. *Jan.* 22. *Singular Lesion of the Urinary Bladder.*—Dr. PACKARD exhibited the right lung and the bladder of a man, æt. 25, who died in the Christian Street Military Hospital, of pleuro-pneumonia following measles.

An immense effusion of turbid serum, full of flakes and shreds of yellow lymph, distended the right pleura and compressed the lung. The two layers of the pleura adhered to one another by means of soft yellow lymph over a space about as large as the palm of the hand, at the side. Spots of congestion, amounting almost to extravasation, were scattered here and there through the lung tissue. The mucous membrane of the trachea and bronchi was deeply reddened, and the bronchial glands much swollen. Nothing abnormal was noticed in the left lung.

All the cavities of the heart were distended with black blood, partly fluid, and partly in soft currant-jelly like clots; on cutting into the ventricles the mass was squeezed up into the incision. Within the pericardium there was a small quantity of turbid serum, but no inflammation of the membrane could be detected.

The liver was rather large and fatty, the spleen soft and pale. The pancreas was so soft as to be easily torn, but was rather injected than otherwise. The kidneys were pale.

On laying open the urinary bladder, which was contracted into a very small space, there were noticed on its floor several elevations, of various shapes, one crest-like, another broad and flattened, but all presenting an intensely red colour as if inflamed, and one or two looking as if ulcerated. The rest of the mucous membrane was perfectly smooth and pale, but a large portion of the surface of the urethra was deeply congested.

Feb. 12. Dr. PACKARD exhibited a urinary bladder presenting a curious analogy to that in the foregoing case, from a man who died of pneumonia supervening upon measles, in the Christian Street Military Hospital.

The right lung was intensely congested throughout, carnified and breaking down easily under the finger or by tearing, at the lower part. Its pleura was universally adherent. The bronchial glands were greatly enlarged. Left lung healthy.

The heart was normal, containing rather more than the usual amount of firm white clot.

The liver was large and slightly fatty; the spleen quite soft.

The kidneys were congested; the supra-renal capsules normal.

The urinary bladder was very small. Being laid open, its mucous mem-

brane was found pale and smooth, except at two points, posterior to the orifices of the ureters, where there existed deep-red, smooth patches, looking like bloodclots. One of these patches was more prominent than the other; the mucous membrane was entire over both of them.

Feb. 26. Compound Comminuted Fracture of the Skull, and Fracture of Ribs.—Dr. ASHHURST presented these specimens, with the following history:—

John S. P. was admitted into the Pennsylvania Hospital, Feb. 17, 1862, about 10.30 A. M., on account of an obscure injury received the night previous. There were two wounds over the left temple; one anterior and smaller, penetrating to the bone, but not connected with any fracture; the other, about an inch and a quarter long, communicating directly with a fracture through both tables of the skull. There was an opening in the bone, oval in form, with some fragments lying loose in the wound, which were removed by the attending surgeon. An escape of brain substance and cerebro-spinal fluid constantly took place from the wound: there was no bleeding from the ear, but a piece of lint saturated with blood was found in the pinna, as if bleeding had occurred previous to the patient's entrance into the hospital. The patient's mind appeared confused, but active; there was an almost complete loss of language. There was very great dyspnœa, and a careful examination revealed a fracture of several ribs on the left side.

The removal of the loose fragments of bone from the skull was followed by some bleeding, which was not, however, so profuse as to be alarming.

Towards night the patient became worse, and the next morning he presented the rather startling symptoms of a pulse of 120 and respiration of 44 to the minute. Being kept, however, at perfect rest, on absolute diet, and with cold applications to the head, with the usual dressing for fractured ribs, he improved, and for several days seemed to be in a favourable condition. On the morning of the 25th, however, there was a decided change for the worse: internal strabismus, at first of the right eye, and afterwards of both; dropping of the mouth on the right side; rapid and anxious breathing, and a running pulse, all betokened danger: while the hands, which lay outside of the bed-coverings, were cold, the skin of the body was pungently hot, a thermometer placed in the right axilla indicating a temperature of 106° Fahr.

Death, preceded by profound coma, occurred about 1 P. M. of the 26th. An *autopsy* was made three and a half hours after death, with these results:—

Thorax.—Fractures of the third, fourth, fifth, sixth, and seventh ribs on left side; extensive old pleuritic adhesions on right side. One small apoplectic clot on outer edge of left lung. Pneumonia of lower part of right lung posteriorly. Ossific deposits on pericardium, and in the heart tissue.

Head.—Valvular wound in left temporal region, and oval opening in skull; several small pieces of bone imbedded in the dura mater and brain: the opening in the skull was about three-quarters by half an inch in dimensions. There was a clot on either side of the longitudinal sinus.

The upper surface of the brain, for two inches on either side of the longitudinal sinus, was covered with lymph; there was much congestion and extravasation under the arachnoid. The tissue of the brain was firm, except around and behind the wound, where it was much softened. The wound ran through the left anterior lobe of the brain to the summit of the left hemisphere, and a large clot filled the cavity.

In this case death resulted from pressure dependent on hemorrhage, which must have been gradual, from the slow approach of the fatal symptoms.

The medico-legal bearings of this case are of interest. In my examination before the coroner's jury I gave the opinion that the injury resulted from a fall rather than from a blow, because the fracture in the skull was above the wound of the soft parts, not below it; and I thought most probably an upward *blow* would have glanced and have produced no fracture. This view was confirmed by the facts elicited.

Gangrene of the Lung.—Dr. LEET exhibited a specimen of this lesion, the history of which was as follows:—

Henry B., aged 49, coloured, was admitted February 16, 1862, into the Philadelphia Hospital, in charge of Dr. Da Costa. He stated that he had been sick for two weeks; but, owing to his evident stupor, his statements about himself were not considered reliable. He affirmed that before the onset of the acute attack from which he was suffering, he had had a cough from time to time, for the last few years. This was corroborated by the nurse, who remembered him in the house, in 1860, with a cough, which improved much under treatment. His condition on admission was one of extreme prostration; his breathing very rapid; his pulse quick and feeble; his skin hot, and covered with perspiration. His face wore an anxious look, and he was evidently not fully conscious. He had spells of coughing, after which he expectorated with some difficulty a quantity of dark sputum, which in parts was of an olive appearance. Like his breath, it was extremely offensive. His weakness was so great that it was with much difficulty he was propped up in bed long enough to permit of the chest being examined. The physical signs detected were marked dulness on percussion at the upper portion of the chest, anteriorly and posteriorly on the left side, and indistinct blowing respiration, not in the least tubular, and entirely unlike that met with in pneumonia. Moist râles could also be heard over both lungs. From a consideration of all the circumstances of the case, a diagnosis of gangrene of the lung was made. The patient remained until the morning of his death much in the same condition as when first seen, not responding in the least to the stimulants that were freely administered. He became more and more stupid, but still not delirious. For several hours before his death the breathing was extremely difficult and very rapid, although unattended with pain; indeed, at no period while under observation did he complain of pain, although he always stated when questioned that he suffered from a dull feeling of oppression. He died on the 24th.

At the *autopsy* a mass of blood, in part clotted, and about a pint in quantity, was found in the left pleural cavity. The whole of the upper and middle portion of the lung was disorganized, presenting a soft, dirty, and broken down appearance, shading off where the lung became more solid, first to a greenish, and then to a grayish hue. The odour from the destroyed lung was highly offensive, and like that of the breath during life. The pleura in the neighbourhood of the disorganized lung tissue had been destroyed. The right lung did not show any signs of disease worthy of notice. The heart was to the eye healthy.

March 12. *Mammary Carcinoma.*—Dr. ASHHURST exhibited a cancerous breast removed by Dr. Pancoast from a patient in the Pennsylvania Hospital.

This patient is a woman forty years of age, who, although married, has

never borne children. Her general health is good, except that she suffers from hæmorrhoids.

She first noticed this tumour, which was seated in the lower portion of the right breast, more than a year ago. It has never given her any pain, but during the last few months has increased rapidly in size. She attributes this to her having used her arm constantly during this time in sewing.

The operation was performed under ether. Several of the axillary glands being enlarged, were removed. The microscope revealed cancer-cells in the tumour itself, but not in the accompanying glands. Since the operation this patient's condition has been as favourable as could be desired.

Rupture of the Urethra.—Dr. LEE exhibited a specimen of this injury, and related the history of the case.

John H., æt. 11, was admitted to the Pennsylvania Hospital March 1, 1862, with rupture of the urethra and extensive extravasation of urine. His mother said that, six months before, he had fallen astride a fence and injured his perineum; he then suffered from retention, but, after some difficulty, a surgeon passed a catheter, which was retained for several days. When this was removed, he could pass a small stream, but his urine soon began to dribble, and has continued to do so ever since. In this state he remained until the day before his admission into the hospital, when the flow of water ceased altogether; his desire to urinate became urgent, and just before going to bed he strained violently to pass water but could not succeed. In the night, the lower part of the abdomen was swollen and tender; he called his mother's attention to it, but she thought nothing of it until the next morning, when she found the hypogastrium of a dull purple hue, and the penis and scrotum very œdematous and of nearly the same colour. About mid-day, she took him to the Jefferson College clinic, where one of the clerks recognized his dangerous condition and sent him at once to the hospital. When admitted (about 3 o'clock P. M.), he was in a state of extreme collapse; skin cold, and no pulse perceptible at the wrist. The scrotum and penis were enormously distended, the former of a dark-brown hue; across the hypogastrium and left iliac region there ran a track of gangrene three inches broad, of a livid colour, with here and there black puffy spots which crepitated under pressure; it was intensely painful to the touch, and the little patient tried to relieve the terrible distension by flexing the thighs on the body.

Efforts were at once made by my colleague, Dr. Ashhurst, and myself, to introduce a catheter, but without success on account of a tight stricture, apparently in the membranous portion of the urethra. I then made free incisions in the penis, scrotum, and gangrenous portion of the hypogastrium, from which fluid with a strong urinous odour freely exuded; no incisions were made in the perineum, as I wished to leave this region free for the operation of perineal section, which, had the little patient rallied, would have been his only resource. After the incisions were made, yeast poultices were applied, and free stimulation constituted the rest of the treatment. At first the patient rallied slightly from his collapsed condition, but he speedily sank again, and died about 5 o'clock the following morning.

At the *autopsy*, the urinous infiltration was found to extend as high as the umbilicus, and laterally as far as the crests of the ilia; thence it descended to the penis and scrotum, which, as already stated, were enormously distended. Upon opening the abdomen no urine was found in the pelvis,

nor was there any perceptible peritonitis; it was evident, therefore, that no rupture existed posterior to the triangular ligament.

The bladder and the whole of the urethra were removed together, when the former was found much thickened and hypertrophied by chronic inflammation, and its mucous membrane was streaked with clotted blood. The urethra was healthy in the prostatic and membranous portions, but at the bottom of the spongy portion a tight impermeable stricture was found, and just behind this a gangrenous rent which was plainly the seat of rupture. The urine had thus escaped first (as usual in such cases) into the perineum, and thence, prevented from reaching the pelvis by the deep perineal fascia, it had travelled upwards along the groin into the connective tissue of the hypogastrium Both kidneys were enlarged and sacculated, and the pelvis of the left was distended to a marked degree; that of the right kidney, although dilated, was much less so than that of the left. Both ureters were also much dilated, but here the dilatation was chiefly on the right side.

The extravasation of urine had been going on for thirty-six hours, for it had evidently begun on the occasion of the straining efforts at micturition made on the evening before entering the hospital.

The case was manifestly one of chronic retention with incontinence of urine, and, had it not been neglected through the ignorance of the parents, could probably have been saved by the same treatment timely applied.

Dr. HARRIS remarked that he had searched in vain, in the journals to which he had access, for a case similar to this in the gradual formation of the stricture. Usually, extravasation of urine took place at once.

Gunshot Wound of Femur and Pubis.—Dr. PACKARD read the following account of a post-mortem examination made by him in a case of this kind, in a young man, æt. 20, wounded at Bull Run, and subsequently imprisoned for several months in Richmond, Va.:—

Autopsy ten hours after death.—Wound only examined. Body excessively emaciated; legs and feet œdematous. Very little, if any, rigor mortis.

The orifice of entrance of the ball, completely cicatrized, was observed near the upper edge of the left trochanter major. The opening by which it had been removed, in the fold between the perineum and left thigh, about opposite the posterior boundary of the scrotum, gave exit to bloody, ill-conditioned pus, whenever pressure was made upon the surrounding parts. From this latter opening there led off several sinuses, lined with black sloughy matter.

On dividing the integuments towards the back of the thigh on a director, and thus laying open one of these sinuses, the trochanter minor, detached, was found, as well as the inner wall of the upper end of the shaft, burst out, as it were, into several fragments. The shaft of the femur seemed swollen and rough; but a closer examination showed that this was a shell of new bone, inclosing the necrosed upper two-thirds of the true shaft. At one part of the anterior face of this shell was an irregular opening, about an inch wide by an inch and a half long, closed by a blackish, sloughy, but tough fibrous expansion. Perhaps an explanation of the necrosis may be found in the fact that several small splinters of bone had been driven down along the medullary canal, and may have wounded the nutritious artery. A clot occupied the canal, very dark-red and tough above, paler and softer below. In the upper part of the cavity of the shell of new bone, there existed several necrosed and decomposing fragments.

The hip-joint, when laid open, was found to contain some turbid reddish synovia, and the foveola of the acetabulum was reddened and evidently unsound. None of the surrounding abscesses, however, had formed any connection with the joint.

The ball seemed to have struck the ischium between the tuberosity and the spine, and to have passed up along the ramus nearly to the crest of the pubis, gouging away the anterior or outer wall of the medullary cavity of the rami.

A sloughy sinus or abscess extended down the inner side of the thigh as far as the knee, and others were traced up under Poupart's ligament as far as the origin of the psoæ muscles.

If, as was stated, this injury was inflicted by a Minié ball (and hardly any other would have produced such havoc), the course taken by the projectile was different from that which has been observed in most other cases. The ball would seem to have entered over the trochanter major, passed backwards and inwards, through the broad cancellous upper extremity of the shaft of the femur; after breaking through the inner wall of the latter, it passed across to the border of the pelvis, and ploughed its way upward till its force was spent. For a round ball to have thus rolled irregularly about would have been no very strange matter; but we have been given to understand that the Minié ball forced its way without deviation.

Another point is well illustrated by this case, namely, that longitudinal splitting seldom, if ever, crosses the line of junction of an epiphysis. Here the shattering of the bone was very severe, and yet above the line just referred to, there was not even a fissure—a fact which accords with the experience of Stromeyer and Macleod.

March 26. Deformity of Legs.—Dr. LEE exhibited the bones of a leg amputated for deformity, and a cast of the limb before removal, with the following history of the case:—

Sanford A., æt. 19, from Ohio, was admitted to the Pennsylvania Hospital March 13, 1862. From infancy, he had suffered from fragilitas ossium, and the lower limbs had been repeatedly fractured; his right leg alone had been broken ten or twelve times. After these accidents the bones would very rapidly unite, so that in two or three weeks he was able to go out again. That firm union was gained so soon could not be established, because he never walked upright, but always upon his knees, dragging the feet after him. This had always been his gait, and by this means he constantly excoriated the shins, which scraped along the ground as he walked; for, from some unknown cause—perhaps from tight splintering after his numerous fractures—both tibiæ had become so bent forward as to leave a sharp and very prominent angle about the middle of the bones. This portion of the leg was protected by a leather casing, but, in spite of it, was kept constantly sore from pressure as the patient walked.

In the left leg the deformity was much the greater, and, as it was also the weaker of the two, Dr. Pancoast determined to remove it, and substitute an artificial leg, by which he hoped to enable the patient to walk erect. The amputation was done by double skin flaps, and, with the exception of some necrosis of the tibia, the patient progressed well. Upon dissection, the tibia was found of normal size, but flattened and bent to a wonderful degree and rather softer than usual; while the fibula, quite translucent and almost as thin as paper, was displaced behind the tibia, so as to be in an

exact line with it antero-posteriorly. The bones of the foot were remarkably attenuated, but the limb was otherwise normal in structure.

In the other regions of the body there was no special deformity, except the fingers of the left hand, which were rigidly contracted as if by chronic arthritis. But the point of special interest about the case was the apparent paradox of coexistent mollities and fragilitas ossium; the bones of the leg were sufficiently fragile to break frequently from the most trivial causes, and yet so soft as to be moulded completely out of shape by the mere application of splints—the patient's testimony on this point being confirmed by that of his former surgical attendants.

Incarcerated Hernia.—Dr. LEE showed this specimen, the history of which was as follows:—

Andrew Wilson, between 70 and 80 years old, was admitted to the Pennsylvania Hospital March 14, 1862. For several years he had had double inguinal hernia, the tumour on the left side being larger than that on the right: and although he wore a double truss, it occasionally slipped down into the scrotum, but was easily returned. On the day before his admission, however, the hernia had come down and he could not reduce it. No pain or inflammation followed, but he became alarmed and came to the hospital for treatment. When admitted he was apparently in good condition for so old a man; no prostration, nausea, &c.; and the scrotal tumour, though exceedingly tense and hard, showed no evidence of strangulation. Nothing, therefore, was done immediately; but after a few hours' rest he was given a warm bath, and was afterwards thoroughly etherized by Dr. Ashhurst, who made careful and long-continued efforts at reduction without any effect. I understood from Dr. Ashhurst that he was under the influence of ether fully an hour. After this he was subjected to no further treatment until the following morning, when the attending surgeon (Dr. Pancoast) arrived. He was now again etherized, and a second prolonged but fruitless manipulation was made by the attending surgeon and one of his colleagues.

Although the hernia was incarcerated only, it was plainly irreducible, and from the obstinate constipation, which had existed several days, the danger of strangulation was imminent. The constriction existed at the external ring alone, and Dr. Pancoast therefore resolved to perform an operation which he had practised with perfect success in seven or eight similar cases, and which he thinks was originally practised by himself, although the suggestion is due to M. Guérin, of Paris. This consists in puncturing the skin over the tumour, introducing a grooved director which is pushed up subcutaneously to the external ring, and there insinuated under the fibres of the aponeurosis of the external oblique muscle, which forms the constriction. The position of the director being now carefully ascertained through the skin, a second puncture is made with a curved bistoury just below the raised bands of tendon, and the fibres carefully divided by rocking the handle of the knife. In other words, the operation is one of subcutaneous tenotomy. After this procedure was adopted, the hernia was with a little difficulty completely restored to the abdomen; a portion of the tumour, by the way in which it returned, was clearly ascertained to be bowel. A compress and spica bandage being applied, the patient was put to bed, and after he had recovered from the effects of the ether a large opening injection was given. This acted but slightly, and during the afternoon, from the restlessness of the patient or the carelessness of the assistants, the hernia came down again.

As soon as I discovered this I removed the bandage and did my best to replace the tumour, but without success. Some pain was caused by the manipulation, on which account the patient was given an opiate and kept perfectly quiet. The following morning a fresh attempt was made at reduction by Dr. Pancoast, and failing in this, he ordered the patient to be etherized for the third time. When fully under the anaesthetic, another more patient and steady effort was made to replace the tumour, but with no better success. Dr. Pancoast was now convinced that some undivided bands of fibres formed the obstacle to reduction; he therefore carefully repeated the operation of the previous day. The hernia was now returned with perfect ease, and was retained in place more securely than before. Dr. Pancoast remarked at the time that the more solid portion of the tumour was hardened omentum. The patient recovered rather slowly from the ether, was ordered a grain of opium every four hours, and that day and the following night he did well. The next morning I noticed some difficulty of respiration, with blueness about the face and nails. Auscultation revealed marked pulmonary congestion and œdema. The opium was at once stopped, and free stimulation, both internal and external, was substituted. Still the patient continued to sink, and died of suffocation about mid-day. The belly was a little tympanitic, but no decided symptoms of peritonitis existed.

At the *autopsy* the lungs were found completely gorged with serous effusion, with here and there a patch of pulmonary apoplexy and much diffused congestion; on the left side were old adhesions, while nearly a pint of serum was found in the right pleural cavity. The *heart* was normal in consistence, but both auricles and ventricles were filled with fluid blood; in the left ventricle was a small fibrinous coagulum, and a few "currant-jelly" clots, but they were extremely soft and diffluent. On laying open the hernial tumour, a little clotted blood was found in the subcutaneous tissue, and the sac, indurated and thickened, was completely adherent to the tunica vaginalis and to the cord. Its internal surface exhibited intense venous congestion, apparently chronic; this extended about an inch above the ring along the peritoneal coat, but no further; there was not the slightest appearance of general peritonitis, nor was the local inflammation of a very high grade.

The neighbouring intestines were quite healthy, but on opening the abdomen the cause of all the trouble was at once seen in a mass of omentum about three inches in every diameter, intensely inflamed, and so indurated as to resemble a piece of India-rubber; from this mass the congested omental vessels spread over the surface of the omentum, gradually lessening in intensity. The other abdominal organs were healthy.

Compound Comminuted Fracture of Thigh: Fracture of Scapula and of Ribs, with Scalp Wounds and Effusion on Brain.—This specimen was presented by Dr. ASHHURST.

Daniel McA——, aged 49 years, was admitted into the Pennsylvania Hospital on the 22d of March, 1862, having been injured by being caught in the belting of some machinery. The shock was very considerable, but he did not appear to have lost much blood.

His left thigh was found to have been fractured in its middle third, and a small wound on the back of the limb communicated with the bone. The main arteries of the thigh were uninjured.

The head of the humerus of the same side appeared to be prominent, and

almost gave the appearance of an anterior luxation, but upon closer examination it was evident that the injury was a fracture of the acromial process of the scapula, which had fallen backwards by its own weight. There were several small scalp wounds on the left side penetrating to the bone, which, however, appeared uninjured. There was marked orbital ecchymosis of the left side which gave rise to suspicion of the existence of a fracture of the skull.

Under stimulation the patient reacted well, but towards evening he began to sink again. At 1 A. M. his pulse was so rapid that it could not be counted, and his respirations 40 to the minute. He henceforth became weaker and weaker, and, finally, died about 4½ P. M. the next day.

An *autopsy* was made five hours after death.

On the *head* there were several small scalp wounds. Some effusion of blood under the pericranium, but no fracture whatever of the skull. Blood was effused on either side of the longitudinal sinus on the summit of the middle lobes of the cerebrum, especially on the right side. There was, also, a small clot on the extreme posterior part of the left side at the base of the brain. Between the membranes and upon the surface of the brain there were about f℥iij of bloody serum. The brain matter itself appeared healthy.

On the left side the acromial process of the scapula was obliquely broken off and a ragged fracture existed in the infra-spinous fossa. The muscles of the shoulder were infiltrated with blood.

The first rib on the left side was broken near its sternal end, the fourth far back. The lungs and heart were healthy; the ventricles contained some small currant jelly-like clots.

The liver was slightly fatty; the other abdominal organs healthy.

The thigh presented a comminuted fracture, the bone being splintered as high as its upper third. The muscles were much lacerated, and some completely torn from their own sheaths.

Death had resulted from the effusion on brain.

April 9. Compound Fracture of Sacrum. Exhibited by Dr. LEE.

John McC——, æt. 45, was admitted to the Pennsylvania Hospital, April 5, 1862, having an hour before fallen a distance of forty feet from a scaffolding, sustaining numerous injuries. He had well-marked fractures of the lower third of the left radius, of both bones of the right leg, and of four or five ribs on each side. There was also a compound fracture of the sacrum. When admitted the right lower extremity was everted and shortened so as to lead to a suspicion of a fracture of the thigh. This error was at once recognized, and while examining the pelvis a punctured wound was observed over the sacrum; the finger introduced into this detected a fracture running transversely across the sacrum with very marked depression of the lower third of the sacrum and the coccyx. These fragments were jammed tightly against the rectum, which, however, was not lacerated; reduction was effected by means of the finger in the rectum, and required considerable force. The patient never rallied from the primary shock, and died in six hours. At the autopsy the sacrum was found comminuted, a large fragment of the left ala being broken off longitudinally and displaced to a considerable extent. The sixth, seventh, and eighth ribs on the right side, besides being broken in several places, were torn from their sternal attachment, the irregular lacerations in the cartilage being plainly visible. Although only six hours had elapsed since the accident pleuritis had already

commenced, the costal pleura on both sides being dry, rough, and intensely injected. Contrary to expectation no lesions of the internal viscera were found.

April 23. Compound Comminuted Fracture of Skull; Fracture of Pelvis and Rupture of Bladder.—Dr. LEE showed these specimens with the following history:—

Wm. Shoemaker, æt. 54, was admitted into the Pennsylvania Hospital, in a comatose condition, at 5.30 A. M., on April 13, 1862. His friends stated that he had fallen during the night from a second story window, at what exact time they could not tell, for he was only found at 5 o'clock in the morning. His respiration was stertorous and blowing, and partial paralysis of the right side existed; the left orbit was densely ecchymosed. On examining the head a punctured wound was found near the top of the left parietal bone, through which distinct fracture with depression could be felt. The line of fracture seemed to extend into the frontal bone and then across the right side, but as the man was evidently moribund no effort to raise the depressed bone and no further examination was made. Both ears were so bloody that no hemorrhage or serous discharge could be made out with certainty. He died within two hours.

Autopsy seven hours after death.—On removing the scalp there was found a large effusion of blood and a most extensive comminuted fracture involving the frontal and both parietal bones, extending into the left orbit and passing through the left zygomatic arch into the temporal bone. When the calvaria was taken off no clot was found under the membranes at the seat of fracture; the membranes, however, were much lacerated, and a large submeningeal coagulum was seen at the base of the brain completely covering in the crura cerebri, and the pons; there was, however, no fracture whatever of the base. Before opening the abdomen a little blood was seen trickling from the penis, and on examination a comminuted fracture of the pelvis was discovered. This seemed to begin at the posterior part of the left ilium, running forward to the acetabulum, where the head of the femur was also indented, and, finally, involving both the ischium and the spine of the pubis. The jagged fragments of the latter bone had made two very large lacerations in the bladder, which was collapsed and lying loosely at the bottom of the pelvis; but the urethra had escaped injury. In the pelvis was effused a large quantity of bloody urine which had begun to infiltrate the connective tissue of the scrotum and hypogastrium. There also existed fracture of four or five ribs, but the thoracic and abdominal viscera were healthy.

Ruptured Peritoneum.—Dr. ASHHURST read the following account of a case of this injury:—

Patrick C—— was admitted to the surgical ward of the Pennsylvania Hospital on the 24th of last December, about 8 P. M. His injuries appeared to be but slight. He had been struck by the cow-catcher of a locomotive on the Norristown Railroad, and presented a contused wound of the brow and slight scratches on both legs. He was excessively drunk and troublesome. During the night he became so restless and even violent that it was necessary to secure him in bed by means of mechanical restraint. He now began to complain of great pain in the epigastric region.

The next morning he was sober, and evidently very dangerously ill; his breathing was very difficult, and accomplished entirely by the diaphragm,

the abdominal muscles being kept as motionless as possible. He was very restless, tossing from side to side, occasionally vomiting a liquid of a dirty green colour, constantly complaining of excruciating pain in the abdomen, and exclaiming that he was going to die.

This state of things lasted through the morning without much change. On going to his ward about 3 o'clock on Christmas afternoon, I found him lying on the floor with his face downwards, having immediately before thrown himself out of bed. He was at once taken up, but expired within a few minutes.

An *autopsy* was made fifteen and a half hours after death, with the following results:—

Abdomen.—There was found very extensive peritonitis, with recent effusion of lymph. Large clots were found in the omenta, especially the gastro-colic. The left kidney was enlarged and much congested, and contained several well-marked clots. The liver was slightly fatty.

The lungs were slightly congested, the congestion being hypostatic.

All the other organs examined appeared to be healthy.

This I believe to have been one of those rare cases of rupture of the peritoneum without rupture of the viscera; for the left kidney, although badly bruised, as shown by the clots found in its substance, did not appear to have been ruptured.

Mr. Pollock, in his paper on Injuries of the Abdomen, in *Holmes' System of Surgery*, considers that the first and most serious danger in ruptured peritoneum is from hemorrhage: this is apt to be profuse if the part injured be the omentum or mesentery, or if, as sometimes happens, the laceration be in the peritoneum covering the pregnant uterus. If, on the other hand, it be the parietal portion which is injured, the hemorrhage will be slight, and the risks of inflammation are principally to be feared. The course of traumatic peritonitis is very rapid: Erichsen refers to a case of gunshot wound in which death ensued after twenty-four hours: there was much serous effusion and puro-plastic matter exuded. In my case, though death ensued only nineteen hours after admission, the appearances of inflammation were well marked.

I have seen several cases of injury to the abdomen which at first caused more alarm than this one, and yet which proved entirely without danger. In one, especially, the man was squeezed between the bumpers of two heavy cars, and when brought into the hospital was, in his own opinion as well as in that of his friends, in a dying condition. Rest for a few days, with sedative and anodyne fomentations, restored him to health.

May 14. *Comminuted Fracture of Pelvis, Fracture of Thigh, &c.* Exhibited by Dr. LEE.

John F., æt. 46, was admitted into the Pennsylvania Hospital April 12th, 1862. A brick wall, suddenly thrown down by some other workmen, had buried him in the ruins. When brought to the hospital, his right thigh was found broken in the upper third; the left fibula was also fractured, and a lacerated scalp wound extended nearly half way around the right side of the head. As some perineal ecchymosis was observed, a catheter was at once introduced, but only after considerable difficulty, a firm obstruction occurring behind the bulb, as if something was closely compressing the canal. Every time a catheter was introduced the same feeling of resistance was encountered, but at the time this was attributed to the large effusion of blood in the perineum. A careful examination made of the pelvis and other parts

revealed no further lesion, and the man was at once put under treatment for his fractures. For a fortnight he seemed to improve, but then became much worse, with frequent rigors, prostration, and generally typhoid condition. In this state he lingered a week longer, and then died apparently of sheer debility. At the autopsy, made eight hours after death, my surprise was great to find a thoroughly comminuted fracture of the horizontal and descending rami of the pubis; a small fragment was driven through the perineal structures and lodged immediately underneath the urethra, behind the bulb; this it was that had formed the obstacle to the introduction of the catheter, the urethra itself being intact, and the perineal effusion caused by the loose fragment. The peritoneum was injected and discolored of a brownish-green hue, with here and there patches of lymph still adhering. There was very little effusion into the viscera, all looked healthy. Along the periosteum covering the ends of the broken fragments of the thigh the soft callus was seen deposited in small quantities, but nothing like an attempt at firm union had taken place.

Dr. ASHHURST called the attention of the Society to two cases of abscesses of the kidney.

1. *Tubercle of Kidney.* The diseased organ, preserved in spirits, was exhibited in connection with this account.

Martin C——, a sailor, aged thirty-two years, was admitted into the Pennsylvania Hospital for gonorrhœa, followed by stricture and fistula in perineo, the fistula opening in the perineal centre. The urethra was much implicated; irritation of both bladder and kidneys was manifested; the urine became loaded with pus, its reaction being acid and at no time ammoniacal. Death took place from colliquative diarrhœa of a few days' duration, on the 11th of July, 1861, nearly eighteen months subsequent to his entrance into the hospital. An autopsy made the next day revealed the following state of things: The body was greatly emaciated, and decomposition had already begun. Pleuritic adhesions existed on both sides of the thorax. The left lung contained disseminated tubercle in various stages of degeneration, with, however, no cavities. In the right lung the deposits of infiltrated tubercle were yet more numerous.

The liver was yellow and fatty in appearance. The intestinal glands were congested, but not enlarged. The left kidney was somewhat enlarged, pale and fatty in appearance, and with the tubuli and cortical portion blended so that it could hardly be said where the one ended and the other began. The right kidney was of enormous size, and contained abscesses in all parts, varying in magnitude from the size of a pea up to that of a walnut. Some hardened masses, small in size and slightly softened in the interior, seemed to indicate a tuberculous nature. But little kidney structure remained. The ureter much thickened, and presenting pus in its course to the bladder, which afforded those evidences of chronic inflammation which were naturally expected.

That the abscesses in this kidney were of a tuberculous nature, may be regarded as probable, from the fact that tubercle was found so extensively in the lungs.

There are, according to Rokitansky, two distinct forms of renal tubercle. The first is merely a symptom of a "very high degree of tubercular dyscrasia," by which many or most of the viscera, especially those of the abdomen, are affected, and by which both kidneys are generally uniformly attacked, while suppuration rarely if ever ensues.

The second form is limited to the genito-urinary apparatus; though it frequently ensues upon a tuberculous state of the lungs, while on the other hand pulmonary tuberculosis not unfrequently follows upon the advanced stages of this kind of renal tubercle. This form generally commences in the testes and the lymphatic glands therewith connected, and is often spoken of as gonorrhœal tubercle, though no difference has been perceived between the deposits in this and other forms of tubercle. One kidney alone is attacked in this form, and great renal enlargement, suppuration and the formation of abscesses of considerable size are among its characteristics.

In this class the case reported would seem to find its place, and it may be regretted that no examination of the testes was made, as had evidence of tuberculous deposit been found there, comparative certainty would have been attained.

Whether the gonorrhœa, for which this patient was first admitted, had any direct connection with the deposit of tubercle, may be doubted. If it had, and such a connection could be shown to exist, the name of gonorrhœal tubercle would not be so inappropriate as Rokitansky seems to consider it.

2. The form of inflammation which in the kidney most frequently terminates in suppuration is chronic, and arises from calculous irritation of the pelvis. Of this condition the following case is an illustration:—

Augustus L——, a seaman, twenty-four years old, died on the 3d of August, 1861, with the condition of kidneys and bladder to be described below.

He was admitted into the Pennsylvania Hospital for stricture of the urethra and incontinence of urine; electricity was applied to the neck of the bladder without benefit. Bougies were passed and injections of laudanum and flaxseed mucilage into the bladder were employed without any good result. About a week before death symptoms of acute cystitis were developed, and the patient soon fell into a state of extreme prostration with cold, clammy skin, running pulse, and ghastly countenance, all of which symptoms persisted until the fatal issue. An autopsy was made thirteen and a half hours after death, with these results: The omentum was adherent to the abdominal parietes. The bladder was very much ribbed and inflamed, and to its mucous surface pus and phosphates were adherent. The kidneys were much enlarged, containing abscesses and deposits of phosphates; the ureters, however, were not affected.

The disease in this case began, no doubt, in the kidney. That inflammation beginning in the bladder should cause nephritis, without involving the ureters, we can hardly suppose, but pus and even phosphatic formations might pass downwards from the kidney and thus produce cystitis without giving rise to any marked changes in the ureters during their course.

These two autopsies occurring within a short time of each other, the patients having been admitted for the same affection (in each case stricture resulting from gonorrhœa), and the post-mortem appearances while presenting at first sight points in common, yet illustrating really far different conditions, all these considerations have induced me to present the cases together to the Society, as suitably accompanying each other, and illustrating some rather obscure points in renal pathology.

Metastatic Abscesses.—Dr. PACKARD gave the following account of an autopsy in a case of so-called *pyæmia* at St. Joseph's Hospital. The patient was a soldier, æt. 25, who had been shot in the right thigh, at

Winchester, five weeks previous to his death. Dr. Hunt, under whose care he had been, made the dissection.

The wound, which was at the upper and inner part of the right thigh close to the vessels, was first examined. An injection of solution of chloride of zinc had been made into the artery, which vessel, as well as the vein, was perfectly sound. On enlarging the wound and reflecting back the skin, rectus, sartorius, tensor vaginæ femoris, and outer head of the vastus, the ball, a large, round, leaden one, was found lying in an intermuscular space; it had been flattened out by striking the bone. The neighbouring muscular tissue was in a state of fatty degeneration. On the anterior surface of the bone, about an inch below the level of the lesser trochanter, was a depressed portion, not involving the entire thickness of the wall of the bone, and having on it a black spot which seemed to indicate the point where the ball struck.

The femoral vein was perfectly sound and healthy, as were also the iliacs and the ascending cava. In the liver an abscess existed at the upper and back part of the right lobe; the organ itself was fatty, but the veins of both systems were healthy. The pus contained in this abscess was thick and clotty, but of a bright yellow colour; its ill-defined walls were composed of softened gland tissue.

Abscesses were found at the posterior portions of both lungs, especially of the left; the lung tissue in the vicinity of these abscesses did not seem to be indurated, and there was no pleurisy apparent.

The heart was of normal size, with rather more yellow fat upon it than is usually seen in persons only twenty-five years of age; it was full of firm yellow clots. All the other organs seemed healthy.

This case would seem of itself sufficient to overthrow the idea that metastatic abscesses are due to an arrest in the bloodvessels of the viscera of pus-cells derived from an inflammation of the veins at some point. It is simply presented as an additional item of negative evidence.

Deficiency in the number of Ribs.—Dr. PACKARD mentioned that at an autopsy made by Dr. S. W. Mitchell, at which he was present, it was found that the subject of the examination had only eleven ribs on each side. The fourth rib on the left side was broad anteriorly, and joined the sternum by a broad cartilage, perforated, as if to indicate its normally double state, by a round hole. On the right side there was simply a broadening of the anterior end of the fourth rib.

The case was one of rapid phthisis in a woman thirty-nine years of age.

REVIEWS.

ART. XII.—*Theories of Life and Organization.*

1. *Recherches Physiologiques sur la Vie et la Mort.* Par F. X. BICHAT. Nouvelle édition, précedée d'une Notice sur la vie et les Travaux de Bichat et suivie de Notes par le Docteur Cerise. Paris: Victor Masson et Fils, 1862. 8vo. pp. 382.
2. *De la Vie et de l'Intelligence.* Par P. FLOURENS, Membre de l'Académie Francaise et Secrétaire perpétuel de l'Académie des Sciences (Institut de France), etc. Paris: Garnier Fréres, 1858. 8vo. pp. 161.
3. *La Médecine Nouvelle basée sur des Principes de Physique et de Chimie transcendantes et sur des Expériences capitales qui font voir mecaniquement l'origine du Principe de la Vie.* Par L. LUCAS. Paris: F. Savy, 1861. Tome 1er. 8vo. pp. 504.
4. *La Vie dans l'Homme; Existence, Fonction, Nature, Condition présente, Forme, Origine et Destinée future du Principe de la Vie; Esquisse Historique de l'Animisme.* Par J. TISSOT. Paris: Victor Masson et Fils, 1861. 8vo.
5. *La Vie dans l'Homme; ses Manifestations diverses, leurs Rapports, leurs Conditions Organiques.* Par J. TISSOT. Paris: V. Masson et Fils, 1861. 8vo. pp. 614.
6. *Discours sur le Vitalisme et l'Organicisme et sur les Rapports des Sciences Physiques en Général avec la Médecine:* Discours prononce à l'Académie Impériale de Médecine, 17 Juillet, 1860. Par M. le Professeur BOUILLAUD. Paris: 1860. 8vo. pp. 75.

LIFE-ACTIONS, their origin and cause, are still vexed questions in medical philosophy. Notwithstanding the steady progress of the *ars et scientia medendi*, during the past twenty centuries, we are compelled to admit that the definitions and theories of life are as unsatisfactory as they are numerous and varied. Than the existence of these theories no greater proof could be adduced of the inherent difficulties attendant upon all investigations into the cause of vital phenomena—difficulties increased tenfold by the confusion which is inseparable from such studies when pursued in accordance with the metaphysical method.

Never, perhaps, will we be able to assign to physiology its appropriate place among the sciences, until the great problem of life is either solved or reduced to a determinate and intelligible formula. The scientific status of medicine must be determined by the position and progress of physiology, which is far from being an exact science. Consisting of numerous isolated groups of facts, whose relations are by no means understood, it is at the present moment in the same condition as was the science of physics anterior to the time of Newton, or that of chemistry before the era of Lavoisier. The discovery and announcement by Newton of the gravitating law of matter, and the universality of its application, were sufficient to stamp all the phenomena of physical science—many of them up to that time inexplicable—with the authoritative seal of precision and

exactitude. So, also, the discovery of the law of chemical affinity by Lavoisier did much to deprive chemistry of its purely experimental and uncertain character, and place it upon an exact philosophical basis. Comparative anatomy and palæontology were for a long time mere collections of details of vague import, until Cuvier proclaimed the important law of the correlation of forms. And now profound thinkers in our profession are thoughtfully awaiting the advent of some medical Newton, who, with discriminating mind, shall separate the true from the "false" facts of medicine, and, with enlarged conceptions of the conditions of life, seize upon and demonstrate that great primitive fact or principle which is peculiar to and underlies and co-ordinates all the phenomena of medicine.

It is a remarkable fact that, in tracing the history of speculation upon the source of vital phenomena, the more we approximate the commencement of the historical period, the more simple and positive do we find to be the notions of life. In the history of philosophy no feature is more remarkable than the pertinacity with which the ancients maintained the existence of an independent principle or force as the primary and efficient cause of motion and life throughout the universe. This was essentially the doctrine of Thales, the founder of the Ionian school, of Parmenides, Archelaus, Heraclitus, Democritus, Pythagoras, Hippocrates, Plato, and Aristotle. The Stoics, according to Cicero, held the same opinion. Long anterior to the time of the Greeks, we can trace it among the Hindoos, Persians, and Egyptians. It appears to have been a fundamental dogma in the Chaldean, Phœnician, and other ancient theogonies, and was for ages inculcated in China by Confucius and his disciples.

After the decadence of Grecian and Roman civilization, and the establishment of Christianity, the ruling doctrine of the ancients concerning the cause of vitality appears to have been forgotten, or altogether subverted and replaced with the most wild and fanciful notions, which, under various forms, continued to prevail and find advocates throughout that long and dreary period familiar to the historian as the Dark Ages.

To become acquainted with the views upon this subject entertained in the latter part of the sixteenth and early portion of the seventeenth centuries, we have only to look into Harvey's work, *De Generatione Animalium*, published in 1651. In this work are embodied the notions of the illustrious English physiologist relative to the vital principle, life and organization. These notions are confused, conflicting, and unsatisfactory, if not, indeed, unintelligible. In the 71st exercise he tells us that—

> "There is a spirit or certain force, inherent in the blood, acting superiorly to the powers of the elements, very conspicuously displayed in the nutrition and preservation of the several parts of the animal body; and the nature, yea, the soul in this spirit and blood is identical with the essence of the stars."

This "spirit," he expressly says, is identical with the *impetum faciens* or moving power of Hippocrates. In another place he asserts that the blood itself, by reason of its admirable properties and powers, is "spirit" —that it is the only calidum innatum, or first engendered heat, and the immediate and competent instrument of life. He quotes Suidas to the effect that the blood is the living principle of man, and adds that this is true of all animals. He combats and ridicules the views of Scaliger and Fernelius, who believed in the existence of a spirit different from the ingenerate heat, of celestial origin and nature—a subtle aura filling the arteries, sinuses of the heart, and ventricles of the brain, and cherished or

renewed by the act of inspiration, and, being of extreme lightness, vanishes insensibly upon the death of the animal.

"What occasion is there," he asks, "for this extraneous inmate, for this ethereal heat, when the blood is competent to perform all the offices ascribed to it, and the spirits cannot separate from the blood even by a hair's breadth without destruction; without the blood, indeed, the spirits can neither move nor penetrate anywhere as distinct and independent matters."

One hundred and thirty-five years after the utterance of this language, the celebrated John Hunter, in his *Lectures on the Principles of Surgery* and his *Treatise on the Blood, Inflammation, and Gunshot Wounds*, gave to the world his opinions upon the vital principle and the connection existing between life and organization. These opinions are worthy of examination, inasmuch as they represent very fairly the condition of the question at the close of the eighteenth century.

"Animal and vegetable substances," says Hunter in his *Lectures* delivered in 1786–7, "differ from common matter in having a power superadded, totally different from any other known property of matter, out of which arise various new properties. * * * * * Unless we consider life as the immediate cause of all actions occurring either in animals or vegetables, we can have no just conception of either vegetable or animal matter. * * * * * In treating of an animal body I shall always consider its operations, or the causes of all its effects, as arising from the principle of life, and lay it down as a rule that no chemical or mechanical property can become the first cause of any of the effects in the machine. * * * * The living principle, in itself, is not in the least mechanical, neither does it arise from, nor is it in the least connected with any mechanical principle. * * * * Although life may appear very compounded in its effects in a complicated animal like man, it is as simple in him as in the most simple animal, and is reducible to one simple property in every animal. * * * * The principle called life cannot arise from the peculiar modification of matter, because the same modification exists where this principle is no more."

So in his *Treatise on the Blood,* published in 1793, he writes:—

"I shall endeavour to show, that organization and life do not depend in the least on each other; that organization may arise out of living parts, and produce action: but that life never can arise out of, or depend on organization. * * * * Mere organization can do nothing even in mechanics; it must still have something corresponding to a living principle, namely, some power. I had long suspected (from about the year 1755 or 1756) that the principle of life was not wholly confined to animals, or animal substances endowed with visible organization and spontaneous motion; I conceived that the same principle existed in animal substances devoid of apparent organization and motion, where there existed simply the power of preservation."

In his *Lectures on the Principles of Surgery,* he tells us that—

"The living principle is the immediate cause of action in every part: it is therefore essential to every part, and is as much the property of it as gravity is of every particle of matter composing the whole. Every individual particle of the animal matter, then, is possessed of life, and the least imaginable part which we can separate is as much alive as the whole."

He acknowledges that "the simple principle of life can with difficulty be conceived," and proceeds to state that "the first and most simple idea of life, is its being the principle of self-preservation, preventing matter from falling into dissolution; and the second is its being the principle of action." In another place he says that "life is not action," and in still another, that it is "the susceptibility to impression, with a consequent power of action."

From these quotations from his writings, it is very evident that Hunter believed and taught—

1. That there is a vital principle.

2. That this principle is neither chemical nor mechanical in its nature, but, on the contrary, is wholly different from any known property of matter.

3. That it resides in, and is peculiar to, animal and vegetable beings.

4. That it is the immediate cause of all the actions occurring in these beings.

5. That in every animal, life is reducible to one simple property.

6. That matter cannot originate life; or, in other words, that the life-principle never can spring from, nor depend on organization.

7. That, indeed, organization and life do not in the least depend upon each other.

8. That the principle of life is not necessarily always associated with visible organization and spontaneous motion, but, on the contrary, may exist in animal bodies devoid of organs and voluntary motion, and possessing but the simple power of preservation.

9. That life is diffused throughout the animal economy, every individual particle being imbued with it.

10. That the idea of life involves and includes the principles of self-preservation and action.

11. That life is not action, but rather the capability of action.

Such are the leading biological views of the great surgeon-naturalist of the eighteenth century. Of some at least of these views, however, Hunter appears occasionally to have had some uncertainty, as will be seen from the following passages which are distinctly contradictory to some of those already quoted. Thus, in the *Principles of Surgery*—

"Life appears to be something superadded to this peculiar modification of matter, *or* this modification of matter is so arranged that the principle of life arises out of the arrangement, and this peculiar disposition of parts may be destroyed, and still the modification, from which it is called animal matter, remain the same. If the latter be the true explanation, this arrangement of parts, on which life should depend, would not be that position of parts necessary to the formation of a whole part or organ, for that is probably a mechanical, or, at least, organical arrangement, but just a peculiar arrangement of the most simple particles, giving rise to a principle of preservation; so that matter so arranged could not undergo any destructive change till this arrangement were destroyed, which is death."

Here Hunter manifestly regards life as the result of a peculiar molecular arrangement of matter.

And, again, in the section *On the Living Principle of the Blood*—

"The living principle in the blood, which I have endeavoured to show to be similar in its effects to the living principle in the solids, owes its existence to the same matter which belongs to the other, and is the materia vitæ diffusa, of which every part of an animal has its portion. I consider that something similar to the materials of the brain is diffused through the body, and even contained in the blood; between this and the brain a communication is kept up by the nerves. I have, therefore, adopted terms explanatory of this theory; calling the brain the materia vitæ coacervata, the nerves the chordæ internunciæ, and that diffused through the body the materia vitæ diffusa. This latter is diffused through the whole solids and fluids, making a necessary constituent part of them, and forming with them a perfect whole; giving to both the power of preservation and the susceptibility of impression, and, from their construction, giving them consequent reciprocal action."

In this passage our author most unquestionably identifies the vital principle either with the substance of the brain or some matter similar to it. His editor, Dr. Palmer, notices this glaring inconsistency, and in vain attempts to explain it by saying that these words of Hunter should not be taken literally. The fact is, however, that these words are but a modified echo of the old neuro-physiology of Hoffman and Cullen—a reproduction of the doctrine of a hypothetical nervous fluid, but in a form more substantial and more in accordance with the strong matter of fact mind of our anatomist.

Judging from his writings, Hunter's mind was eminently self-reliant and progressive in its tendencies. More demonstrative than generalizing, and always open to conviction, he appears to have held as doubtful, and subject to revision or modification, all theories or opinions which could not be directly demonstrated, or which did not rest upon the most unequivocal proofs and reasoning. Bold and independent in the pursuit of truth, he valued opinions just in proportion as they were founded in fact. We generally find him ready to sacrifice theory to fact, whether that theory be his own or not. We are less surprised, therefore, when Hunter, in one place, declares that "life can never rise out of, nor depend upon, organization;" and, in another, that the "principle of life arises out of the arrangement" of matter; when he sometimes says that the life-principle is different from all other known agencies, and at other times identifies it with the matter of the brain; when, in one place, he informs us that this matter is diffused throughout the body, and in another that it has its seat in the stomach; when he confounds the vital principle with a "certain species of motion," and, finally, acknowledges that "life is a property we do not understand, we can only see the necessary leading steps towards it."

It is utterly impossible to reconcile such contradictory statements by suggesting, as Coleridge has done,[1] that the incessant occupation and stupendous industry of Hunter, and his imperfect acquaintance with the arts and aids of logical arrangement, prevented him from fully unfolding and arranging his idea of life in distinct, clear, and communicable conceptions. It is not in consequence of this "unfriendly medium" that he falls occasionally into the "phraseology and mechanical solutions of his age," but rather because his views of life and the vital principle were too vague and too unsatisfactory to himself to permit him at all times to announce these views in positive and consistent language. It is very generally true, even among the uneducated, that clear and distinct ideas find expression in equally clear and simple terms; obscure, involved, and contradictory language is the common and suitable clothing of cloudy, indistinct, and uncertain opinions. The active, progressive, and far-reaching mind of Hunter attempted, with eminent success, to combine the practical every-day duties of his profession with those comprehensive philosophical inquiries for which he manifested such a strong bias, and which, while they in part depended upon the details of daily experience, in return tended to bestow upon practical medicine a rational character by the elucidation of those fundamental principles which connect and harmonize the facts, and so really advance the therapeutic art. Hunter, actuated with the true Hippocratic spirit, brought reason and philosophy to bear upon experience, and steadily set his face against all empiricism. He studied structure not for itself, nor by

[1] Hints Towards the Formation of a More Comprehensive Theory of Life. By S. T. Coleridge. Edited by S. B. Watson, M. D., Philada. 1848, p. 18.

itself, but with a view to function; and he sought to explain function by studying the economy in disease as well as in health. Hence it is wrong to speak of him as a naturalist, or a surgeon, or an anatomist. He was all these, and something more. He was a physiologist as well, and a physiologist, moreover, who, from time to time rising above the mere details of his science, ambitiously sought to discover that great primitive fact or principle which, in common with many other great minds, he considered to exist and be related to the numerous facts of medicine as the law of gravity is to the facts of physical science and affinity to those of chemistry.

In 1793, in the *Aphorismi ex Doctrina Physiologiæ Chemicæ Plantarum* appended to his *Flora Fribergensis Subterranea*, Humboldt defined the vital force as the "unknown cause which prevents the elements from following their original attractive forces."

"If you attentively consider," he says, "the whole nature of things, you will discover a great and permanent difference amongst elements, some of which, obeying the laws of affinity, others independent, appear in various combinations. This difference is by no means inherent in the elements themselves and in their nature, but seems to be derived solely from their particular distribution. We call that matter inert, brute and inanimate, the particles of which are combined according to the laws of chemical affinity. On the other hand, we call those bodies animate and organic, which although constantly manifesting a tendency to assume new forms, are restrained by some internal force from relinquishing that originally assigned them. That internal force which dissolves the bonds of chemical affinity, and prevents the elements of bodies from freely uniting, we call vital. Accordingly the most certain criterion of death is putrescence, by which the first parts or stamina of things, resume their pristine state, and obey the laws of affinity. In inanimate bodies there can be no putrescence."

Shortly after the publication of these aphorisms, and during his residence in Jena, Humboldt wrote his beautiful physiological allegory, entitled *The Rhodian Genius*, which orignally appeared in Schiller's periodical, *Die Horen*, in the year 1795. The language attributed in this allegory to the philosophic Epicharmus, shows conclusively that Humboldt at this early period of his scientific career believed in the existence of a vital force, peculiar and unlike any of the forces which actuate and control the elements as these exist in inorganic matter. He represents the "crude matters of inorganic nature" as hastening at their very birth to associate, in obedience to the laws of affinity, each with its like, and to enter into new combinations. In animal and vegetable bodies the blending of these substances is different. "Here vital force imperatively asserts its rights, and, heedless of the affinity and antagonism of the atoms asserted by Democritus, unites substances which in inanimate nature ever flee from each other, and separates that which is incessantly striving to unite."

Two years later (1797), his views appear to have undergone a change, for "he declared that he by no means regarded the existence of these peculiar vital forces as established."[1] Writing at Berlin in 1849, he assures us that "he has not applied the term *peculiar forces* to that which may possibly be produced only by the combined action of the separate already long known substances and their material forces." He regards the chemical relations of the elements in different bodies as better criteria by which

[1] Versuche über die gereizte Muskel- und Nervenfaser, nebst Vermuthungen über den chemischen Process des Lebens in der Thier- und Pflanzenwelt., vol. ii. pp. 430–436. For a defence of the doctrine of vital affinity against the objections of Humboldt and Daubeney, see Medical Examiner for January, 1853, p. 31.

to distinguish animate from inanimate substances than voluntary motion, the circulation of fluids, and the internal appropriation and fibrous arrangement of the elements. The difficulty of satisfactorily referring the vital phenomena of the organism to physical and chemical laws, depends chiefly," he says, "(and almost in the same manner as the prediction of meteorological processes in the atmosphere) on the complication of the phenomena, and on the great number of the simultaneously acting forces, as well as the conditions of their activity."

The views entertained and publicly taught by Lawrence concerning the vital principle, life and organization, are contained in his *Introductory Lectures* delivered before the Royal College of Surgeons, during the years 1816, 1817, and 1818.

He regards the "functions as the offspring of structure," and "life as the result of organization."[1] He employs the term life to designate the "assemblage of all the functions and the general result of their exercise."[2] With him "organization, vital properties, functions and life are expressions related to each other; in which organization is the instrument, vital properties the acting power, function the mode of action, and life the result."[3]

"In our examination of the phenomena exhibited by living beings," says he, "we follow a method analogous to that pursued in the physical sciences. We trace the succession of events as far as observation and experiment will enable us to pursue them, and we refer them ultimately to a peculiar order of properties or forces, called vital, as their causes. These vital properties are the causes of vital functions in the same way as chemical affinity is the cause of the combinations and decompositions exercised among the component particles of bodies, or as attraction is the cause of the motions that occur among the great masses of matter. Whatever we see in astronomy, hydraulics, mechanics, &c., must be ultimately referred, through the concatenation of causes, to gravity, elasticity, &c. In the same way the vital properties are the main spring at which we arrive, whatever phenomena we may be contemplating in respiration, digestion, secretion and inflammation. Among the most remarkable of these vital properties are sensibility and irritability—the power of perceiving or feeling, and that of contracting. To such properties we refer in our ultimate analysis of the functions, as the mechanician does to elasticity, when he is explaining the motions of a watch, or the astronomer to gravitation, in accounting for the course of the heavenly bodies.[4] * * * * *

"We do not profess," he continues, "to explain *how* the living forces in one case, or attraction in the other, exert their agency. But some are not content to stop at this point; they wish to draw aside the veil from nature, to display the very essence of the vital properties, and penetrate to their first causes; to show, independently of the phenomena, what is life, and how irritability and sensibility execute those purposes, which so justly excite our admiration. They endeavour to give a physical explanation of the contraction of a muscle, and to teach us how a nerve feels. They suppose the structure of the body to contain an invisible matter or principle, by which it is put in motion. Such is the ενορμουν or impetum faciens of Hippocrates, the Archeus of Van Helmont, the Anima of Stahl, Materia Vitæ of Hunter, the calidum innatum, the vital principle, the subtle and mobile matter of others.[5] * * * * * It seems to me," he proceeds, "that this hypothesis or fiction of a subtle invisible matter, animating the visible textures of animal bodies, and directing their motions, is only an

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[1] An Introduction to Comparative Anatomy and Physiology; being the two Introductory Lectures delivered at the Royal College of Surgeons, on the 21st and 25th of March, 1816. By Wm. Lawrence, F. R. S., &c. London, 1816, p. 115.

[2] Ibid., p. 120.

[3] Ibid., p. 121.

[4] Ibid., pp. 150–2.

[5] Ibid., pp. 165–6.

example of that propensity in the human mind, which has led men at all times to account for those phenomena, of which the causes are not obvious, by the mysterious aid of higher and imaginary beings."[1]

It will thus be seen that Lawrence clearly and distinctly ignores the existence of a vital principle, and treats it as a mere chimera. Somewhat inconsistently with the foregoing remarks, he asserts, in another paragraph, that the peculiar phenomena of organized matter present no analogy to those which are treated in chemistry, mechanics, and other physical sciences, and that any reference, therefore, to gravity, to attraction, to chemical affinity, to electricity or galvanism, can only serve to perpetuate false notions in physiology and to draw us away from the proper point of view, in which the nature of living phenomena and the properties of living beings ought to be contemplated.[2]

Finally, as if not quite sure of his ground, he concludes with this language:—

"To say that we can never arrive at the first cause of vital phenomena would be most presumptuous; but it is most true, that all the efforts to penetrate its nature have been equally unsuccessful from the commencement of the world to the present time."[3]

A year later we still find our author, in the *Reply to the Charges of Mr. Abernethy*, with which he prefaces his introductory lecture of 1817, asserting that "life is the assemblage of all the functions, is immediately dependent on organization,[4] denotes what is apparent to our senses; and cannot be applied to the offspring of metaphysical subtlety or immaterial abstractions without a complete departure from its original acceptation; without obscuring and confusing what is otherwise clear and intelligible."[5] He thinks that the "notion of life is too complicated, embraces too many particulars to admit of a short definition, and varies in the different kinds of animals as their structure and functions vary."[6] He is occasionally contradictory and inconsistent with himself. We have just seen that he calls life "a result of organization." In another place he says it "would be unmeaning and nonsensical to call life a property of organization;"[7] he ridicules "those who think it impossible that the living organic structures should have vital properties without some extrinsic aid," and declares that "just in the same proportion as organization is reduced, life is reduced; exactly as the organic parts are diminished in number and simplified, the vital phenomena become fewer and more simple; and each function ends when the respective organ ceases."[8]

The crude and uncertain character of the biological views of Hunter, Humboldt, and many other savants who have indelibly stamped with the seal of their genius the scientific record of the past century, is, undoubtedly, due to their ignorance of the true biological method. The certainty of a science depends upon the method which rules in it and by which it is successfully cultivated, and this method is bound up in, and indicated by the fundamental law, the primitive fact or principle of the science. For physiology, and, therefore, for medicine, which is based upon it, there is a certainty as philosophical, though not as rigidly exact, as that which characterizes the mathematical sciences themselves. But this certainty is

[1] Ibid., p. 174. [2] Ibid., p. 161. [3] Ibid., p 178.

[4] Lectures on Comparative Anatomy, Physiology, Zoology, and the Natural History of Man. By Wm. Lawrence, F. R. S., &c., London, 1848. Bohn's edit., p. 5.

[5] Ibid., pp. 42, 43. [6] Ibid., p. 64. [7] Ibid., p. 58. [8] Ibid., p. 73.

yet prospective, and will remain so until the primitive law of physiology and medicine is discovered and demonstrated beyond cavil.

Attempts to discover this law have not been wanting. Their history has been recorded in the words solidism, humeralism, vitalism, chemicism; in the archeus of Paracelsus, the animal spirits of Descartes, and others, the corpus pneumaticus of Bacon, the æther of Newton, the anima of Stahl, the nervous fluid of Willis, Baglivi, Hoffman, and Cullen, the irritability of Glisson, the vis insita and vis nervosa of Haller, the materia vitæ of John Hunter, the vis vitæ of Gœrtner, the excitability of Brown, the nisus formativus of Blumenbach, the sensorial power of Darwin, the organic spirit of Pring, the conservative principle of Blane, and the vis medicatrix naturæ of a thousand and one writers.

All these attempts were premature and more or less defective, so they failed to establish a correct theory of life. Physiologists of the present day possess strong reasons for believing that the establishment of such a theory must be preceded by the formation of a positive and satisfactory theory of organization; a theory so comprehensive as to embrace all forms of animal and vegetable life, from the most minute and simple to the most gigantic and complex. Already a theory of structure, at once simple and grand, has been erected upon the labours of many zealous naturalists and physiologists, prominent among whom are Cuvier, Bichat, and Schwann.

Both zoology and physiology are greatly indebted to Cuvier for the progressive activity which they suddenly exhibited in the latter part of the eighteenth century. This illustrious naturalist, who, for the comprehensiveness, if not the depth of his intellect, stands alone in the annals of natural history, was the first to associate the study of the earth's strata with the study of the fossil remains found therein; the first, in other words, to co-ordinate the facts and principles of geology and the physics of the globe with comparative anatomy and physiology. It was in 1795 that he announced the great principle that the study and classification of animals should be founded rather upon their internal organization than their external peculiarities. The establishment of this principle did much to transfer zoology from the hands of the mere observer of external characters to those of the anatomical investigator and experimenter. It substituted an exact and reliable method of classification for the artificial system bequeathed to the world by Linnæus. In physiology it paved the way for the solution of the great problem of the duplex life of man, and the connection of this life with organization. It paved the way to the elucidation of this subject in so far as it rendered the laws of the correlation of forms and the subordination of parts available to physiology. These fundamental laws of comparative anatomy were discovered and applied by Cuvier with the most brilliant results. He was not slow in perceiving and duly appreciating the wonderful adaptation of the parts which make up the living mechanism. He saw that every organ in an animal is related to all the others, and they, in turn, to it. Observation, comparison, and reflection, faculties which he possessed in an eminent degree, led him to conclude that the form of an organ being given, we might readily determine the forms of all the other organs with which it had been associated. Thus, the form of the teeth, and, in certain cases, even the form of a single tooth, determines the shape of the condyle of the lower jaw; the form of the condyle determines the character of the glenoid cavity which receives it, and this cavity indicates the contour of the zygomatic arch, the appearance of the temporal fossa, &c. The form of all these parts determines the mode of mastication, and

this latter expresses the form of stomach and intestines, and the kind of digestion.

In details of this character Cuvier was eminently great. But he used them chiefly to determine species and genera, and to found a classification of the animal kingdom, more exact and natural than the famous system of Linnæus. With their physiological bearing he troubled himself but little. And this is the more remarkable since the functions are bound together by a correlation even more intimate than that which associates the organs themselves. Thus, respiration, when it is accomplished in a circumscribed respiratory organ, as the lungs in man, cannot do without a circulation, since the blood must be brought into contact with the organ which receives the air, and it is by means of the circulation that the blood is transported from one part of the economy to another. The circulation cannot dispense with irritability, for this irritability determines the contractions of the heart, and, consequently, the movements of the blood. Muscular irritability, in its turn, is in harmony with the nervous system. If one of these functions change, the others alter also. If the circulation is wanting, the respiration can no longer be circumscribed. It must go on throughout the whole body, as in insects; for if the blood is not made to seek the air, the air must be carried to meet the blood. The quantity of respiration everywhere determines the vigour, rapidity, and even the kind of motion. The motion which requires the greatest muscular energy is flight; the bird has, consequently, a double respiration. It respires by means of lungs, and throughout its whole body; for the air having traversed the lungs, is thence conveyed into large sacs in the abdominal cavity, and, finally, into the cavities of the long bones. Throughout this entire tract the blood is aerated. The movements of mammals are more limited, and their respiration is simple. The mammal respires by its lungs only, and these lungs are confined to one part of the body. But its respiration though simple is complete, for all the blood in its body passes through the lungs before being distributed to the tissues for the purposes of nutrition. The reptilia with feeble and sluggish movements combine a very imperfect respiration. Their pulmonary circulation is only a part of the general circulation. Hence, only a part of their blood is aerated. An impure blood circulates throughout the body, their temperature is lessened, their movements are slow and interrupted by long repose; they hibernate. On the other hand, fishes, still lower in the animal scale than reptiles, have a complete pulmonary circulation; but in so far as it is aquatic, it is imperfect, for the air breathed is only that which is mechanically mixed with the water. Fishes like reptiles have a cold blood, and their movements require, in general, but little muscular energy. Thus it will be seen that four kinds of respiration prevail in vertebrated animals; the double respiration of the bird, the simple but complete respiration of the mammal, and the incomplete respiration—incomplete in two different ways—of reptiles and fishes. These four varieties of respiration determine four species of motion in these animals, to wit: the flight of the bird, the walking, leaping, or running of the mammal, the crawling of the reptile, and the swimming of the fish.

Respiration and digestion are harmonically connected. The more extensive the respiration, the more rapid and powerful the digestion. In birds the digestion is most rapid, in reptiles it is slowest. The bird astonishes us by the frequency of its repast, the reptile by the length of its fast.[1]

[1] See Flourens' "Cuvier, Histoire de ses Travaux." Paris, 1845, pp. 151–156.

Other examples might readily be given to show how all the organs, all the functions, all the modifications of organs and functions are made for each other, and for a great and predetermined object.

Enough has been said, however, to show how much the philosophy of physiology is indebted to the Cuvierian method of contrasting animals by their organs, instead of their external characters. But valuable as is this method to the physiologist and the pathologist too, a still more valuable one was indicated by the celebrated Bichat, of whom it has been said that, "if we compare the shortness of his life with the reach and depth of his views, he must be pronounced the most profound thinker and the most consummate observer by whom the organization of the animal frame has yet been studied."[1] Though inferior to Cuvier in the comprehensiveness of his knowledge, he was decidedly superior to that great naturalist in his physiological acumen and in the grandeur of the generalizations which he sought to establish. He boldly dealt with the most momentous topics in biological science; he dealt with them with a degree of enthusiasm and laborious earnestness rarely to be met with. He investigated the human organism with a view to obtain some clear and definite notion concerning the causes and nature of life. He sought to establish a theory of life by investigating the physical and chemical properties of the structural elements of the human body. He saw that something more was required than the mere comparison of organs. He saw in the labours of Carmichael Smyth, Bonn, Bordeu, and Fallopius the germ of a great method, of a great instrument of research. With them he recognized the physiological value of the tissues; but his conception of this value was far greater and more philosophical than theirs. With an industry almost unparalleled, he resolved all the organs of the body into twenty-one tissues, essentially distinct, but possessing in common the two great properties of extensibility and contractility. "These tissues he subjected to every sort of examination; he examined them in different ages and diseases, with a view to ascertain the laws of their normal and pathological development. He studied the way each tissue is affected by moisture, air, and temperature, also the way in which their properties are altered by various chemical substances, and even their effect on the taste."[2] Pinel informs us that in the course of these investigations he opened in one winter no less than six hundred bodies.

Let us contemplate the biological picture which his genius bequeathed to us in the work whose title stands at the head of this article.

Life in the entire organic world is twofold. There is an organic or vegetable life, and there is an animal life also. These two lives may exist separately or in combination with each other. The former is common to all living beings, and is strictly essential; the latter is confined to one group only of living beings, and is not essential to the maintenance of the organism. Vegetable life is fundamental, and upon it animal life, wherever it exists, is superposed. Organic or vegetable life can exist alone; animal or relative life can exist only in combination with the former. Vegetable life, however, is not on this account more important than animal life; for, although it cannot be denied that in by far the greater number of organized creatures the latter is merely supplementary to the former, yet we find, as we ascend the organic scale, that vegetative life loses the importance arising

[1] History of Civilization in England. By H. T. Buckle. Vol. i. p. 639.
[2] Buckle, op. cit.

from its fundamental character, and serves merely to sustain and minister to that animal life which attains its highest expression in the moral and intellectual attributes of man. Organic life is limited to the triple process of reproduction, assimilation, and disintegration. Animal life exhibits itself in spontaneous motion, and in moral, mental, and instinctive manifestations. The first life is for the most part internal, unconscious, and continuous; the second life is in the main external, conscious, and intermittent. These two lives are governed by different laws, which, though intimately connected, are to a certain extent antagonistic to each other. They find their highest expression in man, who, in virtue of his organic life, exists solely for himself, while through his animal life he is enabled to move, to feel, and to judge, and is thus brought into active relation with his fellows and with external nature in general.

Now the twofold life of man is inseparably connected with his organization. The organism is the necessary and active medium through which this life is manifested. We say necessary and active, for all that we know of life is through structure, and structure eternally modifies the laws of life. There being two lives exhibiting themselves in peculiar ways, we might suppose, *à priori*, that there are two kinds of structure—two classes of organs. To get a good idea of the double life of man we may contrast the organs whose actions constitute the varied phenomena of life. Only by a careful study of these phenomena in reference to the organism, on the one hand, and the conditions of existence, on the other, can we hope to understand the nature of life.

The organs or instruments of the vegetable life of man are characterized by a certain irregularity, some of them being symmetrical and some not. Those of his animal life are remarkably and uniformly symmetrical; everywhere they exist in pairs. There are two eyes, two ears, two nares separated by a median partition, two hands, two feet, two arms, two legs; there are two brains, or, rather, two hemispheres, a right and a left—two spinal marrows, or, rather, two symmetrical halves of the medulla spinalis. All the nerves of animal life originate in pairs, or are symmetrical. With these facts the ancient physiologists were perfectly familiar. They drew from the head to the foot a median line, and so divided the human body into two lateral and symmetrical halves. Indeed, there exists an old book written in Latin and entitled "De Homine Dextro et Sinistro," or "Man, Right and Left."

The organs which subserve the vegetative or organic life of man are not all as symmetrical as Bichat maintained, but are irregular, in so far as some of them exist in pairs and some do not. Thus, the stomach, intestines, liver, spleen, pancreas, &c. are non-symmetrical. The lachrymal, salivary, and mammary glands, the kidneys, testicles, and ovaries are symmetrical, as also, strictly speaking, are the penis, vagina, uterus, &c. The heart, like the sphenoid and ethmoid bones of the skull, is symmetrical; the lungs are nearly so in man and many of the mammals, as the lama, the rhinoceros, and the porpoise. It is entirely symmetrical in birds, in the Chelonians, most of the Saurians, and all the Batrachians. The branchiæ, or gills, are symmetrical in all the fish, in the mollusks, in the crustacea, and in the worms. The tracheæ are symmetrical in the insects. On the other hand, air-breathing mollusks have a single pulmonary cavity. In the reptilian class, some of the lizards and nearly all the serpents have one lung very small in comparison with the other; in some of the serpents the small lung

disappears entirely. In the boas the short lung is one-half as long as the other; in the typhlops it is one-fourth.[1]

The organs of animal life being double, while those of organic life are for the most part single, the former life is enabled to rest, to stop part of its functions, and to renew them again. For organic life, on the contrary, there is no rest but in death. Organic life never sleeps. It is a stranger to the alternations of sleeping and waking, phenomena so characteristic of animal life. The brain may sleep, and the whole economy be benefited thereby; the wearied muscle may rest and come out of that rest with renewed vigour. For the heart and the lungs there is no rest, no cessation from toil. With them, to rest, were it even for a moment, is to die.

The wonderful processes of nutrition, disintegration, and calorification, processes by which the living body is built up, broken down, and heated in the self-same moment, admit of no interruption. Being single, admitting of no supplementary aid, they are by their very nature incessant. On the other hand, the functions of animal life are by their very nature adapted to periods of activity and periods of repose. Who can think earnestly while he runs quickly or toils briskly with his arms. If the right arm is fatigued the left can relieve it. This is true of the legs, of the eyes, of the hemispheres of the brain, &c.

The essential intermittence of animal life renders it capable of improvement; the equally essential continuousness of organic life deprives the latter of this capability. Comparison must precede improvement. The comparison of one state with another leads to the rectification of error in the past or present, and its avoidance in the future. Organic life, not being interrupted or broken into stages, is not amenable to comparison. Animal life, on the contrary, is divided into such well-marked periods of activity and periods of repose that its stages are eminently comparable with each other. It is in consequence of this repeated comparison that the unintelligible cry of the infant is gradually perfected into the copious, flexible, and glowing language of the high caste races of men; that memory, reflection, and judgment are matured and strengthened; that the senses are brought to such a wonderful state of perfection; and that the vocal muscles of the skilful singer are enabled to produce such extraordinary musical effects.

But the theory of life promulgated by Bichat was a failure. It failed, not, however, because the method was erroneous, but because the application of the method was not extensive enough. It was impossible for Bichat to accomplish more than he did in his short, laborious, and brilliant life. Had his life been prolonged it is difficult to say what he would not have accomplished. We must judge him less by the results of his labour than by the philosophical spirit which actuated his efforts. With a loftiness of thought to which the anatomists and physiologists of his day were entire strangers, he attempted to connect the fundamental object of philosophical anatomy with the fundamental theory or principle of biology. He attempted to find the connecting link between the statics and dynamics of physiology. Now, the fundamental object of philosophical anatomy, if we may use the formula of Comte, is the "reduction of all the tissues to one primordial elementary tissue, from which they are developed by modifications more and more special and profound, first of structure and then of composition."[2]

[1] See Flourens' "Cuvier," edit. cit., p. 184, and "De la Vie," p. 29.

[2] Comte's Philosophy of the Sciences; being an Exposition of the Principles of the *Cours de Philosophie Positive* of Auguste Comte. By G. H. Lewes, London, 1853, p. 188.

Bichat resolved all the organs into twenty-one tissues. This was a great step. To reduce these tissues to one primordial form—the cell—years of patient and laborious research were required by the lynx eyed men of the microscope. The day in which Bichat lived was not prepared for this generalization. It was not effected, indeed, until so late as the early part of the present century, and the labours of very many men were required to bring it to maturity.

The doctrine of cell-genesis, the broadest generalization at present known to statical physiology, began with Malpighi in the recognition of the blood-corpuscles as small globules, in the latter half of the seventeenth century, and received many of its early facts through the industry of Leuwenhoek, Hewson, and Haller, whose labours tended strongly to establish an individuality of organization unknown apparently to the ancients. It was not, however, until so late as 1816, that the great idea of the structural unity of the organic world began to take a definite shape in the minds of physiologists. It was in that year that Treviranus announced the broad generalization that all the tissues were reducible to three morphological elements—the amorphous, fibrous, and globular. But this announcement, though regarded as remarkable for its correctness, and far in advance of the knowledge of that day, was afterwards shown not to be broad enough. The great work of Hensinger, which appeared six years afterwards, the discovery of the nucleus of the vegetable cell by Robert Brown, in 1833, the investigations of Purkinje and Deutsch upon cartilage, corpuscles, and the process of ossification, the researches of Valentin, in 1835, upon the formation of pigment-cells around pre-existing nuclei, and the comparison instituted by him between the cells of vegetable tissue and those of cartilage, the observations of Schultze upon the histology of the blood, and particularly upon the cell-relations of the blood-particles, the labours of Henle, Vogel, Donné, Boehm, and many others, and, finally, the announcement of the law of developmental unity for all vegetable cells made by Schleiden in his great work on phytogenesis, published in 1838, were all necessarily preliminary to the discovery and enunciation of the cell theory promulgated by Thomas Schwann, in 1839. This theory is essentially one of structure and organization, and as such should be regarded as the indispensable forerunner of the true conception of the theory of life. Life we can study only through or by means of its phenomena, and these are exhibited in their simplest and most easily recognized form in the growth and development of the simple cell—the structural unit of the entire organized world. But growth and development, philosophically viewed, are simply modes or varieties of organic motion. The study of life, therefore, narrows itself down to the study of cell-motion as produced and influenced by the physical conditions of life.[1] But these conditions are many, constantly varying in intensity, and the facts which we possess concerning them have been accumulating for ages. Already out of these facts is now being developed a theory bolder and more comprehensive by far than that of cell-genesis—a fitting companion to the latter—and strictly dynamical or biological in character. We allude to the "correlation doctrine," so-called, which seeks with no little promise of success to resolve all the active external conditions of life into one universal imponderable force or principle—itself, perhaps, the essence or principle of life.

[1] "Daily advances in science," says Dr. Gull, in the oration delivered before the Hunterian Society, in 1861, "make it more and more probable that organized beings are the necessary development of the physical conditions of our globe."

These two great theories of cyto-genesis and physico-vital correlation, the one structural, the other dynamical; the one explanatory of form and function, the other of the active influencing cause of form and function, are beginning to be regarded by physiological thinkers as the two broad roads leading to a generalization more simple, more beautiful, and still more comprehensive than any with which biological science has yet been crowned.

Pressing on with industrious and philosophic zeal along the former of these two roads we find Remak, Virchow, Weber, Redfern, His, Böttcher, Billroth, Paget, and many others. Prominent among these, for his voluminous and valuable labours in this field of research, we may particularize, without injustice to his cotemporaries, the celebrated Rudolf Virchow, who, following Remak in discarding the theory of the evolution of cells from a structureless blastema, as advocated by Schleidan and Schwann, has become the leader of the new pathological school which bears upon its banner the fundamental doctrine—*Omnis cellula e cellulâ.*

"Especial difficulty," writes this learned biologist, "has been found in answering the question, from what parts of the body action really proceeds—what parts are active, what passive. * * * * * The cell is really the ultimate morphological element in which there is any manifestation of life, and we must not transfer the seat of real action to any point beyond the cell. * * * * * It is almost impossible for any one to entertain more mechanical ideas in particular instances than I am wont to do when called upon to interpret the individual processes of life. But I think that we must look upon this as certain, that, however much of the more delicate interchange of matter which takes place within a cell, may not concern the material structure as a whole, yet the real action does proceed from the structure as such, and that the living element only maintains its activity as long as it really presents itself to us as an independent whole."[1]

On the other highway of research leading to the true theory of life we encounter, among many others, Vanuxem, Metcalfe, Grove, Carpenter, Faraday, Mayer, Radcliffe, Hinton, Leconte, &c.

According to Leconte there are four plans of material existence rising successively in importance above each other. Elementary existence constitutes the lowest. Chemical compounds (the mineral kingdom) form the second. The third plane is that of vegetable existence; the fourth and highest that of animal existence. Matter can pass from the lowest to the highest plane only by degrees, and in consequence of a greater expenditure of force than is necessary to keep it in the plane of elementary existence. Any amount of matter returning to a lower plane by decomposition must set free or develop a force which may raise other matter from a lower to a higher condition. "Thus decomposition," he says, "must in every case develop force, which force may take the form of heat as in combustion, or electricity as in electrolysis, or may expand itself in forming chemical compounds, or even in organizing matter."[2] Decomposition, he thinks, is necessary to develop the force by which the organization of food or nutrition is effected. The egg during incubation evolves carbonic acid, and, probably, water also, and loses weight, but gains in organization, the latter being in proportion to the former. Heat is here indirectly transformed into a vital force causing decomposition of a part of the organic matter,

[1] Cellular Pathology, as based upon Physiological and Pathological Histology. By Rudolf Virchow. London, 1860, p. 3.

[2] The Correlation of Physical, Chemical, and Vital Forces, and the Conservation of Force in Vital Phenomena. American Journal of Science and Arts, vol. xxviii, p. 305.

which latter, by descending from the organic to the mineral plane, sets free a force which may raise the remaining portion into a slightly higher condition. The decarbonization of the blood by the action of oxygen upon it, though serving for the production of animal heat, and the removal of effete materials, may have the higher purpose of yielding force to the blood itself for the maintenance of its vital state. The exercise of our organs leads to their increased growth in consequence of the fresh organizing force supplied by the decomposition of the tissue. Indeed, to use the language of a very suggestive contributor to the *Cornhill Magazine*, "there is a ceaseless round of force-mutation throughout nature, each one generating or changing into the other. So the force which enters the plant is heat, or light, &c., and is stored up in its tissues, making them organic; this force, transferred from the plant to the animal in digestion, is given out by its muscles in their decomposition, and produces motion, or by its nerves, and constitutes the nervous force."[1]

We have thus, in brief terms, indicated the direction which physiological inquiry is at present taking with regard to the subject under notice. Like two divisions of an army marching by different but converging routes to the attack of a fortified stronghold, the students of biology are steadily advancing along two separate paths to become masters of a theory of life and organization which shall deprive medicine of its empiricism and give to it a scientific and rational character. J. A. M.

ART. XIII.—*Epilepsy: its Symptoms, Treatment, and Relation to other Chronic Convulsive Diseases.* By J. RUSSELL REYNOLDS, M. D., Lond. London, 1861. 8vo. pp. 360.

Epileptic and other Convulsive Affections of the Nervous System, their Pathology and Treatment. By CHARLES BLAND RADCLIFFE, M. D. Third edition, Lond. 1861. 12mo. pp. 312.

THE method of numerical analysis has not ceased to enrich medical science and medical art since it was first explained and illustrated by Louis. His most distinguished English disciple, Dr. Walshe, dedicated to him a treatise on diseases of the lungs and heart, which has become classical, and now he himself receives from Dr. Reynolds the inscription of the most important work which has yet appeared upon a disease at once the most terrible in its phenomena and the most obscure in its pathology. Thus it is that truth grows into power. Dr. Reynolds' medical training peculiarly fitted him for the task he undertook. Accurate and discriminating observation is at the basis of all reasoning about the causes and nature of diseases; but to diseases of the nervous system none of those physical methods are applicable which have unravelled so many knotty questions concerning disorders of the lungs and heart, of the digestive and urinary organs. Until very recently the functions of different portions of the nervous system were imperfectly determined and consequently the interpretation of their derangements was in a great degree conjectural. To appreciate and explain

[1] Physiological Riddles. Cornhill Magazine, July, August, September, and October, 1860.

the phenomena of epilepsy, therefore, it became essential that the physiology of the nervous system and the pathology of its various diseases should be familiarly known, so that both deductively and inductively the mechanism which produces symptomatic epileptiform convulsions and idiopathic epilepsy should be demonstrated. This preparatory examination Dr. Reynolds performed in his work on "The Diagnosis of Diseases of the Brain, Spinal Cord, Nerves, and their Meninges," in which he showed himself a faithful disciple of the doctrines which Marshall Hall spent his life in elucidating, while in the present treatise he has more thoroughly combined physiological principles deduced from experiment with the pathological inductions of a minute numerical analysis of clinical phenomena. We greatly err in our estimate of his conclusions if future observation shall materially impugn their accuracy.

Dr. Radcliffe's new edition of his well-known essay is in fact almost, as already stated in our number for January last (see pp. 198–201), a new work, for he tells us that the whole has been rewritten and recast. Its distinguishing feature consists in the elaborate and very ingenious argument of the author in support of the theory of epilepsy which he adopts, and which we shall again refer to.

Since the publication of Herpin's treatise ten years ago, all writers upon epilepsy have seen that to arrive at any correct conclusions in regard to the nature and cure of the disease, idiopathic cases of it are alone suitable for analysis, however useful the analogy of other spasmodic affections may be in illustrating the nature and the proximate cause of convulsion in general. In truth it seems now to be pretty certain that in their various forms convulsion, and also paralysis, are little more than general symptoms, requiring, indeed, for their expression, the intervention of the nervous system, but neither denoting with certainty the particular organ of that system which is affected, nor the nature of its derangement. Symptomatic epileptiform convulsions, *i. e.*, convulsions identical with those of epilepsy but attributable to a definite organic cause, are as various in their origin as the organs of the body from which a mechanical irritation may be carried to the medulla oblongata and reflected thence to the muscular system, or as the conditions of the blood capable of exciting the specific spasms. But apart from these there is a class of cases in which neither during life nor after death can any starting-point be discovered for the irritation which results in convulsion, and these we are obliged to regard as examples of true idiopathic epilepsy. Yet it is quite possible that the time may come when even such cases may prove to be examples in which a more recondite but not less powerful irritating cause acts in the same manner as the mechanical causes of epileptic spasm now ascertained to exist. However this may be, it is certain that the nature and phenomena of epilepsy will be most clearly exhibited by a searching analysis of cases in which the essential phenomena of the disease are isolated and disengaged from all accidental conditions which would otherwise tend to obscure them.

In a chapter introductory to the pathology of nervous diseases Dr. Reynolds presents some considerations upon the nature of disease in general, in which it is assumed that the vital actions of an organ depend upon interstitial physical changes within it. Although it is afterwards stated that of vitality and organization neither is antecedent to the other in point of time, and however difficult it may be to conceive of life abstractly from matter, it appears to us a doctrine fraught with danger in which such an independent existence is denied. It must still be admitted that living organized matter being given, we can conceive of no change in the phenomena of its

existence without a corresponding change in its organization, or that upon which its organization depends, its nutrition. Convulsions, therefore, must depend upon modifications in the physical condition of the organs through which they are manifested; and for convulsions of the same kind the immediate or proximate organic cause must always be the same, however different may be the remote cause. No other belief is consistent with the fundamental postulate of the uniformity of the laws of nature. Dr. Reynolds assumes that the *proximate* cause of convulsions is always the same, and consists in an abnormal increase in the *nutritive changes* in the nervous centres, and that the *remote* causes are those which tend to induce such an abnormal increase. Even if these propositions were admitted to be true, it is not very clear in what manner or to what degree they throw light upon convulsions generally, or specially upon its epileptic form. For, after all, we must admit that both the proximate and remote causes are specific, since their operation produces effects *sui generis;* and that in idiopathic epilepsy, no remote organic cause of it being discoverable, there is a connate predisposition to this peculiar form of disease. The predisposition may consist merely in the inability to tolerate or resist certain external or internal impressions, but if it leads to epilepsy its specific causative influence is none the less real. Again, if we admit that certain remote causes generate a molecular condition of the nervous centres which issues in convulsions of a particular kind, we are obliged also to admit that in certain individuals an innate peculiar susceptibility of those nervous centres exists which implies that they at the same time possess a peculiar molecular constitution. But whether this peculiarity consists in something less or something more than belongs to the perfectly normal type is purely conjectural. Quite probably it belongs to the same category of organic conditions that create temperaments, and those peculiarities of temper, disposition, and intellect which distinguish classes of men and individuals from one another.

Leaving, for the present, the arduous question of the nature of epilepsy, we shall follow Dr. Reynolds in some account of its phenomena. He defines epilepsy to be "a chronic disease characterized by the occasional and temporary existence of loss of consciousness, with or without evident muscular contraction," and insists upon its being an idiopathic disease distinct from eccentric convulsions, from toxæmic spasms, from the convulsions attendant upon organic lesion of the cerebro-spinal centre, and, in fact, from every other known and appreciable malady. He therefore blames Dr. Sieveking, Bright, and others who have attempted to base a natural history of the disease upon cases in which definite lesions existed equally with those in which none such were discoverable. By the author's method, if strictly observed, it is evident that the essential elements of the disease must become disengaged from others which are only associated with it accidentally. Other writers have professed to follow it, but none, hitherto, whose accuracy in diagnosis has withstood a searching criticism.

The symptoms of epilepsy are considered under two general heads—1, the interparoxysmal, and 2, the paroxysmal. It is evident that a paroxysmal disease must be associated with some peculiarities during the intervals between the paroxysms, however difficult it may be to detect them in recent cases and whenever the attacks occur at long intervals. In the present instance, the brain being the organ which is chiefly implicated, it is only natural to suppose that some *intellectual* peculiarities should be observed. Such, indeed, is the statement made by the greater number of writers upon the subject; and, because idiocy and insanity are frequently associated with

epilepsy, they have often been regarded as its natural concomitants or consequences. Dr. Sieveking does not remember a case "of ordinary severity" without some flaw in the mental faculties; but Dr. Reynolds' analysis shows—1. That epilepsy does not necessarily involve any mental change; 2. That considerable mental impairment exists in some cases, but that it is the exception, and not the rule; 3. That women suffer more frequently and more severely than men; 4. That the commonest failure is loss of memory, and that this, if regarded in all its degrees, is more frequent than integrity of that faculty. These are his most important conclusions, to which it must be added that in thirty-eight per cent. of the whole number of cases analyzed by him no mental alteration was discoverable.

Regarding *sensational* phenomena between the paroxysms, this author finds—1. That severe headache is an exceptional phenomenon, but that slight and occasional headache is common; 2. That women are more liable to it than men; 3. That vertigo also is rare, but less so in the female than in the male sex, and is of the kind which has been termed "subjective." In regard to disturbed *motility* it appears, among other conclusions—1. That evidences of it are presented in a large majority of epileptics; 2. That of the three forms of motor disturbance, clonic spasm is the most frequent, tonic spasm the least frequent, and tremor occupies an intermediate position; 4. That all of these forms are most common in the male sex, and clonic spasm especially so; 5. That their high development is most frequent in the female sex; 6. That trachelismus is an exceptional form of muscular disturbance; and 7. That disorders of motility are more frequent than disturbances of the mental condition.

"The general picture of the epileptic," says Dr. Reynolds, "is that of an individual with trembling hands and uncertain movements, whose gait is awkward, and whose limbs, or whole frame occasionally, exhibit startings, or present a restlessness resembling slight chorea. It must be remembered, however, that the picture may be that of a strong and robust man, with every movement resembling that of health and ease."

The *organic condition* of epileptics during the intervals of their attacks it is of great importance to determine correctly, since a particular view of it, and the one which is taken by Dr. Radcliffe, is closely related to the theory of the disease which he illustrates and defends. This writer asserts that the circulation of the epileptic is habitually feeble, and his hands and feet cold, but Dr. Reynolds, after showing that Tissot, Portal, Maisonneuve, Georget, Cooke, Miller, and Prichard make opposite statements, proves, by an analysis of his own cases, not only that epilepsy may coexist with physical health and strength considerably above the average, but that the coexistence of epilepsy with such extremely robust health is more common than its coexistence with extremely impaired health. He makes the further remark, which is an important one, that there are no special departures from organic health which are characteristic of epilepsy, but that when impaired it is in the following order of functions, viz., temperature, strength, and nutrition. On the whole, and regarding the entire state of health, animal and organic, he concludes that epileptics moderately or slightly impaired in health are more than twice as numerous as those whose condition is more seriously damaged.

The symptoms of the epileptic paroxysm are considered by Dr. Reynolds under the two forms usually described of epilepsia mitior, with local tonic spasmodic movements, and epilepsia gravior, with general tonic and clonic convulsion, to which are added simple loss of consciousness without con-

vulsion, and general or partial convulsion without complete loss of consciousness. The simplest and mildest type is that without evident spasm, but with a sudden and temporary, but absolute arrest of both perception and volition, and followed by a confusion of mind, dulness of apprehension, and depression of spirits. Or it may be preceded and accompanied by vertigo and partial loss of muscular power, or, rather, of mental control over it. Even if standing, the patient rarely falls, and often, as consciousness returns, he resumes the action he was engaged in at the moment of the seizure, without being fully aware of what has taken place. Next to this in gravity, but of greater frequency, is epilepsia mitior, in which the degree of spasm varies from a slight contraction of a few muscles, usually of the face, to a tonic contraction and temporary rigidity of the whole body. It may be unassociated with evident vascular changes, or, again, the face may be pale and the pulse feeble; or, on the other hand, there may be duskiness followed by flushing of the countenance and throbbing of the heart and arteries.

We cannot follow our author in his account of the phenomena of epilepsia gravior. It does not differ materially from that of previous writers, but it is rendered much more complete than theirs by an analysis of the phenomena, particularly in regard to their relative frequency and their succession and combination. It will well repay perusal. In regard to that form of the paroxysm in which there is convulsion without complete loss of consciousness, we learn that it has been observed and described by several writers, and particularly Maisonneuve, who relates four cases. Dr. Radcliffe furnishes an example, and Dr. Reynolds five others, of this singular form of disease. In one of these, the symptoms were those of sudden tonic contraction in the muscles of the face and neck, with suffused face, embarrassed respiration, twisting of the head, and slight tremulous rigidity of the arms, the whole lasting from three to five seconds, and the patient not only affirming afterwards, but evidently exhibiting at the time, persistent consciousness. In regard to the epileptic *aura*, the author states that he never met with anything like that described by the old authors under this name, but in one case the jerking of an arm, and in another the drawing up of a leg, extended apparently towards the trunk, and passed into a general paroxysm so soon as it reached the latter; in a third case, a stabbing pain in the arm preceded the attacks; and in all these the fits might occasionally be arrested by grasping firmly the thigh or upper arm, or by forcibly extending the limbs.

Under the general head of the *etiology* of epilepsy we find that Dr. Reynolds' experience leads him to believe that an hereditary tendency to the disease is much more common than it is generally represented to be by recent writers upon the subject. In regard to age and sex, the analysis of his observations teaches that the approach of puberty is a powerful predisposing condition, and that females under ten and males above twenty years are most likely to become epileptic. A case is mentioned in which the first attack occurred at the age of seventy, and without any assignable cause. In about one-fourth of his cases Dr. R. could discover no cause whatever of the attacks, and in nearly one-fifth the cause was doubtful; of the remainder, psychical causes were equal in number to all of a physical nature, including in the latter category eccentric irritation, general organic changes, and the action of external agents.

If we seek to learn the *natural history and relations* of the different forms of attack we find that epilepsia gravior is twice as frequent as epilep-

sia mitior; but that for the latter to exist alone is an excessively rare occurrence. Yet it is not a preliminary stage out of which the graver form of the disease is subsequently developed, nor, on the other hand, is it an after consequence of that form; but it is an attendant phenomenon, absent in some cases, and occurring in others, but at no particular period in the development of the disease. According to the author's experience, which agrees with that of Delasiauve, regular periodicity is exceptional in epilepsy, and in only three women could he detect any habitual relation between the attacks and the catamenial state. At the same time he admits that in a majority of cases there is an approximation to periodicity in the recurrence of the attacks. Important conclusions relative to the influence of frequency of attack are these; frequency of attack and mental deterioration are more commonly associated than are opposite conditions; a high rate of frequency is more commonly associated with slight degrees of motor disturbance; and while individuals whose attacks were of very frequent occurrence exhibited, positively, no defect in their general health, those, on the contrary, in whom the organic condition was much below par, presented only a low rate of recurrence. "It is evident, therefore, that a high rate of frequency of recurrence is not determined by organic ill health; but that, on the contrary, a notable frequency of attack is associated with unimpaired general health." Nor is there any constant relation between the age of the patient and the rate of frequency of the attacks; for, although they are most apt to recur frequently in persons under the age of seventeen years, youth by no means necessarily entails a high rate of frequency. Indeed, when the commencement is very early, as during the first twelve years of life, the rate of frequency is commonly low. Nor, again, has the total duration of the disease any relation to the frequency of the attacks.

The *mental condition* associated with epilepsy is a subject of peculiar interest, for it has been generally believed that sooner or later in the progress of the disease the mind becomes impaired, and reason is lost in dementia or mania. A close analysis of cases, however, proves that there is no relation between mental failure and a hereditary predisposition to epilepsy, nor any between this state of mind and the age at which the disease commences, nor between this state and the mere duration of epilepsy. It appears, however, contrary to Esquirol's opinion, that when epilepsy commences after puberty the intellectual condition is impaired more rapidly. When the general organic health is exceedingly good there is a greater tendency than exists in epileptics *per se*, to deterioration of the mental condition; but so soon as the general health fails, and in the degree to which it fails, does the mental condition relatively improve. At the same time the mental condition of epileptics cannot be wholly referred to their state of general health, for a sound state of mind or any degree of mental failure may coexist with perfect organic health, or with the opposite condition. Just as little can the mental failure of an epileptic, or its degree when present, be referred to the number of attacks he has experienced, but it has a constant and direct relation to the *frequency* of the seizures. The converse is not, however, true. Frequency of seizure is not necessarily followed by mental failure; it is one, but neither the sole nor a necessary condition of this result. Again, it follows from Dr. Reynold's analysis that when attacks of E. mitior are present the mind is more frequently affected, and affected gravely, than when the individuals are free from the slighter seizures. Yet, as these may exist without entailing mental incapacity, it follows that they are not essential to the result. This author concludes, that while

neither form of attack necessarily entails upon the sufferer mental injury, yet when both forms coexist mental failure occupies a more marked and a more direct relation to attacks of E. mitior than to those of E. major. These conclusions materially modify the general statement of Dr. Radcliffe that "the natural tendency of epilepsy is assuredly towards dementia," even when qualified as it is by the admission that it is possible for an epileptic to live many years, and to have many fits without losing the powers which are necessary to render him an agreeable and serviceable member of society. (P. 139.)

In regard to the *motor condition*, and its state in regard of general organic health, Dr. Reynolds shows that those individuals in whom tremor, clonic, and tonic spasm are present do not exhibit any higher rate of frequency of attacks than do those from whom such disturbances of motility are absent, and, therefore, infers that the causes of the attacks and of the disturbances alluded to are not identical, and that neither is the cause of the other. Nor is there any constant relation, and, therefore, not any inter-dependence between tremor, clonic spasm, or tonic spasm, on the one hand, and deficiency, nutrition, strength, or temperature on the other. Tremor and also clonic spasm are apt to be associated with impaired strength and temperature; but tonic spasm does not affect the nutrition.

It is remarked by Dr. Reynolds that in describing the *consequences* of epilepsy sufficient care has not been taken to distinguish between conditions which may properly be so called and those which are due to other diseases. An examination of his own cases leads him to the conclusion that the *duration* of epilepsy exerts a slight and only doubtful influence upon the patient's health, and it is quite as likely to be impaired in a recent as in a protracted case. He also infers from the same data, that "epilepsy does not produce, *i. e.*, that it, *per se*, does not cause failure of memory, of apprehension, or of ideation, tremor, clonic spasm, or tonic, loss of nutrition, temperature, or strength." And he shows that the opposite opinion is attributable to the very heterogeneous character of the cases denominated epilepsy, which have served as materials for the greater number of those who have written concerning the disease.

The proper *complications* of epilepsy, or "those conditions which may be held to depend more or less directly upon the attacks," are few in number. Epileptic *mania*, the author remarks, has a character of its own. Generally furious, sometimes ecstatic, in other cases it is marked by dulness and depression of spirits; or, on the other hand, by preternatural gayety.[1]

Apoplexy would seem, *à priori*, to be a very natural termination of the repeated and violent attacks of congestion of the head which are characteristic of the fully developed attack of epilepsy. But, as in so many other instances, experience contradicts the anticipations of, we will not say science, but reasoning; Dr. Reynolds assures us that "it is exceedingly rare to find that actual hemorrhage has occurred;" and adds, "no single instance of such an occurrence has presented itself in my own experience." He is

[1] Upon this subject the reader will consult with interest and advantage a memoir by M. Jules Falret (*Archives Générales de Méd.*, Dec. 1860, and Avril and Oct. 1861). The author describes minutely different phases of mental aberration with an incontrollable propensity to commit violence which characterize the vertiginous and convulsive forms of epilepsy, and those cases in which the epileptic character of the disease is unrecognized or misconstrued. The subject is one which demands the attention of the medical jurist, and it is particularly in its relations to criminal law that M. Falret has illustrated it.

unable to trace the character of the relations between *idiocy* and epilepsy. Of *paralysis* he makes the same remark as of apoplexy. It stands in an accidental, not an essential, relation to epilepsy.

The *pathology* of epilepsy is discussed by Dr. Reynolds in a very able manner. He brings to its elucidation a thorough acquaintance with all the most recent results of anatomical and physiological investigation, and subjects them to a rigid criticism guided by the only sufficient test, clinical experience. Unfortunately, clinical experience is apparently not uniform and consistent in its teachings, for it is invoked with equal confidence by those who maintain the most opposite doctrines. This is true even in regard to pathological questions, the elements of which are comparatively stable and readily appreciable by the senses; it is much more so when the phenomena to be studied are fluctuating and not uniformly associated with the same, or, it may be, with any material change of structure.

Dr. Reynolds propounds the following questions: 1. What is the organ on whose modifications the symptoms of epilepsy depend? 2. What is the nature of its change? 3. How was that change induced? 4. What are the links of connection between that change and the pheaomena of the disease?

To the first question pathological anatomy answers, 1, that no structural change is constantly found at all periods of the disease; and 2, that some lesions are of more common occurrence than others. But as none are uniform, or even approach to uniformity in occurrence among the lesions which may be considered as efficient causes of epileptic phenomena, no one of these lesions can be regarded as the essential cause of the paroxysm. The observation of Schrœder van der Kolk, that enlargement of the capillary vessels and granular degeneration of the medulla oblongata are to be found in the bodies of epileptics is very important and significant; but this observer himself speaks of the lesions in question, not as the causes, but as the "proximate result of the fits." Physiological experiment furnishes a different answer, while it corroborates the conclusion just expressed. Brown-Séquard, Kussmaul, and Tenner have proved by experiments upon animals whose cerebral hemispheres and cerebellum had been removed, that epileptiform convulsions may be excited in them by irritation of the medulla oblongata, and that this irritation may act efficiently whether it be applied directly to the nervous centre in question or indirectly to it and to the spinal marrow by irritating the remote branches of nerves supplying the skin and other organs. But convulsive movements do not constitute the whole of epilepsy. Its more characteristic symptom is the loss of consciousness which attends them, and which necessarily implies some changed condition in the cerebral hemispheres. The ancient opinion prevailed until recently, and was accepted and extended even by Marshall Hall, that the phenomenon in question is due to congestion of the brain. Yet it is evident that the evidences of cerebral congestion present themselves late in the paroxysm, whereas loss of consciousness is its earliest symptom. It had long ago been shown by Sir Astley Cooper that compression of the carotids and consequent anemia of the brain will induce loss of consciousness and epileptiform attacks. Clinical observation furnishes abundant proof of the same pathological fact. Dr. Brown-Séquard and others have demonstrated that the arteries of the brain-meninges contract through reflex stimulation, the centre of such a reflexion being the medulla oblongata.

"There appears, therefore," says Dr. Reynolds, "no reason for doubting that the immediate cause of loss of consciousness is arrest of the cerebral circula-

tion, owing to the contraction of the vessels, through irritation propagated along the vaso-motor nerves from the medulla oblongata; and thus the latter is shown to be the organ wherein both elements of the epileptic paroxysm have their origin."

Not that this nervous centre originates those elements, but only that it is the channel through which the organic causes operate to produce the phenomena of the attack.

What, then, is the *nature* of the morbid change?

"In early cases," says Dr. Radcliffe, citing the conclusions of Schrœder van der Kolk, "in early cases of epilepsy, it is true, we may fail to find anything characteristic even here [*i. e.*, in the medulla oblongata]; but in confirmed cases this organ is harder than natural, from the interstitial deposit of a minutely granular albuminous matter, or else softened, swollen, and presenting evident signs of fatty degeneration. The posterior half is also redder and more hyperæmic than it ought to be, even when the patient had not died in a fit; and on making a more minute examination, the bloodvessels are seen to be dilated to thrice their natural dimensions, and with their walls much thickened. These vessels, moreover, are seen to be especially dilated in the course of the hypoglossus nerve and corpus olivare in epileptics who were in the habit of biting their tongue in a fit, and in the course of the roots of the vagus in epileptics who were not in this habit."

But all of these changes are, as we have already seen, effects and not causes of that which occasions epileptic convulsions. In the early attacks, Dr. Reynolds remarks:—

"Nutrition is affected dynamically and temporarily; there is no recognizable departure from textural integrity; there is merely the difference that exists in health and in all organs between action, over-action, and repose; after a time, and by frequent repetition of attacks, the changes, induced temporarily, become permanent, and the texture, which is the product of foregone nutrition processes, is altered statically and persistently."

Now, as regards the nature of the irritation which determines the convulsive attacks, it must be borne in mind that all the movements of the respiratory and other organs upon which the sustenance of life depends, are reflex actions, as well as many others which can also be performed by the operation of the will. Dr. Reynolds reminds us that the unconsciousness of the epileptic paroxysm has its analogue in ordinary sleep, a state which has never yet been explained, and that under the influence of emotion the phenomena of convulsions occur in daily life and as parts of our healthy activity. The conclusion must therefore be that in epilepsy the functions of the reflective centre are changed in degree rather than in kind.

But if changed in degree, *is there increased or diminished action?* Upon this question Dr. Reynolds and Dr. Radcliffe arrive at diametrically opposite conclusions, the one finding in all the phenomena of the fit "evidence, not only of disturbed equilibrium, but of distorted, misdirected, and exaggerated power," and the other concluding that the facts adduced by him "will scarcely warrant the idea that epilepsy is connected with anything like over action of the nervous system." Dr. Radcliffe attempts to show by a very ingenious induction that the blood, instead of being a stimulus to muscular contraction, tends, on the contrary, to prevent it, and that its withdrawal promotes first irregular muscular contraction, and finally, after death, tonic rigidity. In like manner, after a long experimental and rational inquiry, it seems to him "no improbable idea that muscular elongation is coincident with the presence of electrical action in muscle and nerve, and that muscular contraction is coincident with the

absence of this action. It would seem to be no improbable idea that there is a state of polarity in living muscle during relaxation which produces relaxation, and that contraction is nothing more than the necessary result of the muscle being liberated from this state." Relaxation, then, is, according to Dr. Radcliffe, the active condition of muscular fibre, contraction "nothing more than the necessary result of the muscle being liberated from this state, and left to the operation of the attractive force which is inherent in the physical condition of the muscular molecules." Applying this theory to the phenomena of epilepsy, Dr. Radcliffe maintains that the activity of the medulla oblongata, so far from being augmented during the attack, is deprived of its normal power and abandons the muscular system to its inherent organic contractility. Upon this view we think it would be sufficient to remark that it renders extreme if not insurmountable the difficulty of explaining the clonic character of epileptic convulsions. It adapts itself, as the author shows, to the phenomena of rigor mortis, and in some degree to those of tetanus, but it leaves unexplained the source from which convulsed muscles derive the power of regaining their normal condition, since, according to the hypothesis, they begin their morbid contraction with a loss of power.

But to return to the question of increased or diminished action in epilepsy. As Dr. Reynolds very appropriately remarks, the terms "action" and "over-action" used in reference to the medulla oblongata imply both the capacity for receiving impressions and the faculty of giving forth motor impulse. In epilepsy the former appears to be constantly in excess, as Dr. Brown-Séquard has pointed out, and this is almost the sole causative element of the paroxysm in epilepsia mitior, whereas in the graver forms of the disease motor excitability is predominant. The susceptibility of the motory nervous centre is proved even between the paroxysms by the readiness with which the nervous equilibrium is disturbed and attacks are produced by emotional or moral commotion. This double exaggerated susceptibility of the functional activity of the medulla oblongata and upper part of the spinal axis appears to be the immediate cause of the convulsive phenomena of epilepsy. But what awakens it and with it the convulsive and other characteristic phenomena of the disease? Undoubtedly in many cases an eccentric irritant may be detected, or something which may be held to act as such, although the supposed causes differ from one another as widely as organic disease of the brain, mental excitement, the mechanical irritation of a distant nerve, and some more or less definite vitiation of the blood. But in many other cases no such influence can be demonstrated, and we are therefore compelled to admit a peculiar and innate susceptibility to the disease. Such a susceptibility it is doubly imperative that we should recognize when epilepsy is purely hereditary, or the causes which develop it are of slight intensity, or appear to acquire their morbid influence by frequent repetition. Of the latter class are those excitations which induce a state of the organism analogous to the epileptic condition.

"In this manner," says Dr. Reynolds, "pertussis passes into convulsion—coition or masturbation into epilepsy; and in the same way the latter has been developed by violent laughter from tickling the feet."

"The facts would appear to show," says Dr. Radcliffe, "that the habitual state between the paroxysms of ordinary epilepsy is one which is marked by a weak and slow pulse, by cold extremities, and by shallow, or retarded, or sighing breathing, and which is most marked in this manner when the danger of the attack is most imminent."

And again :—

"The interparoxysmal state in ordinary epilepsy is marked by wanting vigour both in the circulation and in the respiration."

But debility is denied by Dr. Reynolds to exist in more than one-half of the cases of epilepsy. He also proves that, instead of a low condition of vitality favouring the recurrence of the fits, the reverse is true; and the paroxysms are shown to be most frequent and severe in those whose organic vigour is unimpaired. Moreover, in this class of patients both forms of the disease, E. gravior and E. mitior, are apt to be combined, whereas in impaired health E. gravior is mainly the form which the paroxysms assume. Again, as we have already seen, the mental power has a stronger tendency to deteriorate when the general health is remarkably good, and relatively to improve when the latter declines. Such are among the results of a clinical study of epilepsy, and, as Dr. R. remarks, it is not a sufficient answer to assert that debility is the cause of convulsion in that disease, however clear the evidence may be that cerebral anæmia is a cause of convulsion. Convulsion is not epilepsy, but only one of its symptoms.

Among the conditions favourable to the production of epilepsy, the cachexiæ are often excited, probably for no better reason than that, because a tangible and demonstrable cause could not be discovered, the equally mysterious conditions denoted by the name just mentioned might be accused without much risk of their innocence being demonstrated. Dr. Reynolds states that fifty-six per cent. of the epileptics examined by himself were free from all cachexia; they were in perfect health of body. We cannot but feel surprise that so acute a physician as Dr. Radcliffe should cite, apparently in support of this doctrine, a passage like the following, which it is little to the credit of Dr. Todd that he should have written :—

"I hold that the peculiar features of an epileptic seizure are due to the gradual accumulation of a morbid material in the blood, until it reaches such an amount that it operates upon the brain in, as it were, an explosive manner; in other words, the influence of this morbid matter, when in sufficient quantity, excites a polarized state of the brain, or of certain parts of it, and these discharge their nervous power upon other parts of the cerebro-spinal centre in such a way as to give rise to the phenomena of the fit."

It would be difficult to find anywhere a greater number of gratuitous assumptions and illogical deductions crowded into so small a space as in these few lines.

Certain conditions of the economy, however, appear to act as determining causes of epilepsy. In some of them, it is true, local centres of irritation exist, which may operate by a reflex agency, as in puberty, pregnancy, and dentition; in others, smaller in number, there is a morbid nutrition change, as in rheumatism and pneumonia. The real value of these elements as causes of epilepsy will depend upon the degree of predisposition to the disease in cases where they appear to develop it, and this, according to Dr. Reynolds' observations, appears to have been very decided.

The last mode mentioned by this author in which the medulla oblongata and the upper part of the spinal axis may become so affected as to produce epileptiform convulsions, is the operation of some lesion of the nervous system, such as a cerebral or spinal tumour, chronic meningeal inflammation, softening of the brain, neuromata, &c.; but he repeats the important observation that the clinical history of these cases differs from that of idiopathic epilepsy, in that they present superadded phenomena depending upon the character of the local lesion in each case.

Having thus attempted to elucidate the morbid nature of epilepsy, the author proceeds to a rational explanation of the various phenomena of the paroxysm. In the first stage, as already explained, loss of consciousness is attributed to the arrest of the vascular supply by spasmodic contraction of the cerebral vessels; tonic muscular contraction to undue action in the medulla oblongata passing downwards to the spinal cord; arrested respiration is attributable to closure of the glottis, to fixation of the respiratory muscles, or to both combined, the second agency being the most operative by far. The epileptic cry he regards as a spasmodic phenomenon, and not as expressing distress; and pallor of the face as produced by the same sort of influence which occasions loss of consciousness, viz., spasmodic contraction of the arteries. This explanation of the former symptom originated with that singularly sagacious observer Whytt, whose great merits it has required the lapse of a century to disclose. Duskiness of the face is admitted to be caused by the "trachelismus" of Dr. Marshall Hall, by which the return of the blood through the cervical veins is prevented. Dilatation of the pupil is, like pallor, the result of over-action in the dilating fibres of the iris; and feebleness of the radial pulse is due either to muscular tonic spasm concealing it at the wrist or arresting it at the shoulder.

In the second stage, continued loss of consciousness is owing to congestion rather than anæmia of the cerebral hemispheres. "In the first stage the epileptic's brain had no action—now it has a morbid action; in the former it may be said to have been dead or defunct—in the latter to be poisoned or narcotized." Clonic convulsion is a consequence of the circulation of carbonized blood; laborious respiration and tracheal gurgling are obviously effects of asphyxia primarily induced by tonic spasm, as are also palpitation of the heart and throbbing of the arterial pulses. It is during the clonic stage that the contents of the bladder, rectum, and vesiculæ seminales are discharged, and that profuse lachrymation and salivation occur. These phenomena are all due to pressure upon the several receptacles and glands. The after stage of "stupor," when this exists, is one of exhaustion and partial paralysis, and its severity appears to be "in proportion to the amount of asphyxia, the latter being determined by the duration of the tonic stage of the attack." From an analysis of the conditions under which the epileptic aura is observed, the author regards it as a peculiar induced condition of the peripheric expansion of certain centripetal nerves, and this one of exalted impressibility or functional activity. When thus changed, these nerves are capable of setting up abnormal motor reactions upon the application of slight stimuli.

The phenomena of the interparoxysmal condition, in their relation to the central fact of the disease, are explained by Dr. Radcliffe as follows: As to mental failure, it is important to observe that this does not exist in more than one-third of the cases; in the others it is very analogous to the decay which accompanies old age, and results chiefly from incapacity for attention, which in its turn is associated with a listless indifference to everything. As we have already seen, it is not proportioned to any of the phenomena of the disease, and Dr. R. thinks it must depend "upon a peculiar condition of the brain, induced (but only in some individuals) coetaneously with that which is the cause of the paroxysms." That this deterioration of the functions of the brain is due to its impaired structure is most probable, because it is in direct proportion to the frequency of the attacks.

Time is therefore wanting for the complete repair of the damage which the brain's structure has sustained during the paroxysm.

The chapter on *Diagnosis*, as might be expected, illustrates the peculiar skill of the author in a field in which he has already been distinguished. The greater number of convulsive affections are in little danger of being confounded with epilepsy by acute and accurate observers. Eccentric convulsions, although individually presenting all the phenomena of epilepsy, do not constitute that disease. If the irritating cause which occasions them is removed before they have had time to produce organic changes in the brain, they cease to occur. As Dr. Reynolds remarks, the distinction is a real one, and of the highest importance in the direction of treatment. In one word, it is essential to the idea of epilepsy that its paroxysms should arise in the first instance, and recur at intervals subsequently without the operation of the same definite exciting cause. Similar remarks are applicable to toxæmic convulsions. As to those which proceed from tumours, softening, chronic meningeal inflammation, &c., of the brain, the inter-paroxysmal symptoms, if attentively observed, will generally afford sufficient ground to base a diagnosis upon. The distinction of such diseases from one another is not involved in the present discussion. In general terms, these groups of organic cerebral disease differ from epilepsy in the following particulars:—

"There is extreme irregularity in the period of recurrence of convulsions symptomatic of cerebral disease. Their appearance is preceded and accompanied by aggravation of the other symptoms, and often followed by the development of new phenomena. The attacks have rarely all the characters of fully developed epileptic paroxysms; either consciousness is partially retained, or there are no asphyxial changes; or the irregular spasms continue for a much longer period; or they are confined within narrow limits; or they are not followed by coma."

Of the *prognosis* of true epilepsy, Dr. Reynolds offers no flattering account. Out of eighty-one cases, eight only absolutely recovered, or ten per cent. Various circumstances influence the prognosis. Thus, when the cause is most obscure, there is most reason to apprehend the existence of a strong inherent proclivity to the disease, and, therefore, to indulge but a slender hope of removing it. In regard to age, Dr. R. found, at the time of the fits ceasing, the age of his patients that recovered was between fifteen and thirty-two, and the disease had commenced at ages between thirteen and thirty-one. In regard to the mental condition of epileptics, the presence of hereditary predisposition appears not to exercise an unfavourable influence; but the reverse is true as regards the female sex, and the commencement of the disease after childhood and puberty. As a general rule, when the mind has suffered much, it has suffered early. It has been already stated that intellectual impairment is more commonly associated with a vigorous condition of the health than with the reverse. The danger to life in an epileptic is a somewhat remote contingency; and in true epilepsy the attacks rarely leave behind them either paralysis or other change of motility, or any notable injuries to the organs, or functions of special sense.

We were not surprised to find so small a portion as only thirty pages of Dr. Reynolds' work devoted to the *treatment* of epilepsy, and half of these to the narration of illustrative cases. From his point of view the records of cures of this affection are not trustworthy, because they comprise all

epileptiform convulsions as well as simple idiopathic epilepsy. To separate the two categories from one another, and accurately estimate the value of the therapeutic element in each, would be impossible. The records of the last twenty years are less chargeable than earlier ones with this defect, but they are by no means free from it. As Dr. Reynolds remarks, "The first essential is diagnosis: organic disease of the brain, diathetic disease, and eccentric convulsions must be eliminated carefully: we must know what we have to treat." This is an unquestionable truth; and when we observe how it has been neglected in the purely empirical treatment of the disease, we cannot feel surprised at the farrago of drugs to which anti-epileptic virtues have been attributed. On the other hand, we are indisposed to subscribe to the proposition that the rationalistic method has failed "in a still larger number, because the theories upon which it has rested have often been abundantly wrong." Had the theories been demonstrably true, they would never have served as a basis for treatment—they would only have accomplished what the author of this work has so happily attempted, and furnished to the physician cases identical in their nature, in the treatment of which he would still have been obliged to employ remedies empirically. The disease isolated by observation, and the remedy discovered empirically, are the two essential factors in all scientific cures.

When, therefore, Dr. Reynolds lays down, as indications in the treatment of the epileptic condition, "the reduction of undue excitability," and "the improvement or the maintenance unimpaired of the mental powers and the general health," and mentions as means thereto "the administration of sedative medicines, the establishment of counter-irritation, and the maintenance of a certain regimen," he merely formulates what universal empirical observation has taught. Science endeavours to justify art, but does not add a tittle to the powers of art; she may prevent a wasteful expenditure of art's resources, but renders them not a whit more or less intrinsically valuable. The indication "to reduce excitability" is not a discovery of science, it is the instinctive teaching of common sense. Nothing is practically gained by formulating in those words what the records of medicine show was in every physician's mind from the beginning. "Excitability," as we call it, was patent in the muscular and other disordered phenomena of the disease; experience had taught the power of certain agents to allay disorders more or less similar to those of epilepsy; and these agents, which afterwards were designated by the common epithet, narcotics, were resorted to in the hope of curing epilepsy also, *i. e.*, the convulsive disorder which appeared to constitute the disease. It were well, therefore, that we should remember that the natural growth of knowledge is inductive, and always proceeds from particulars to general propositions, and that any of the latter not so developed are generally fallacious, if not necessarily false.

In reviewing the particular narcotics and sedatives which are intended to fulfil the indication of "reducing excitability," Dr. Reynolds relies, perforce, upon the testimony of experience, and includes in his list agents as different as opium and hyoscyamus, conium and belladonna, Indian hemp and Selinum palustre. From what we know of the mode of operation of these medicines it would be difficult to refer their curative power to a common quality, even that of diminishing general sensibility. The operation of some among them, opium and belladonna, for instance, appears to be directly antagonistic. Leaving any criticism of principle, it is of more interest to know that, as a physician, Dr. Reynolds has found all of these and some other

analogous medicines, including chloroform, palliatives and nothing more. Bromide of potassium, oxide of zinc, ammonio-sulphate of copper, and nitrate of silver, he has no confidence in, although of the second he admits that he cured one case by it, and that many were improved for a time. In stating that "according to Herpin's own account of it, but little value can be attached to its employment," there appears to be an error, since the author referred to ranks it second of all the remedies that he tried. The various bitter and metallic tonics are useful, Dr. R. believes, only in special conditions of the general health, as iron when anæmia is present. Dr. Radcliffe, perhaps looking too steadily at his theory of debility as the root of epilepsy, expresses a more favourable opinion of tonics, but particularly of the nutrient tonic cod-liver oil, and other oils, and is disposed to think that "they may have some claim to be regarded as of special use, not only in cases of epilepsy, but also in all other cases in which the brain and nervous system are in need of a tonic."

Counter-irritation finds no favour in Dr. Reynolds' eyes; nor does frugal diet; and he regards the success of Heberden, Cheyne, and others by the latter means as exceptional. Dr. Radcliffe expresses a similar opinion. Moderate but not fatiguing exercise is recommended by both of these writers. In sleeping the head should be raised, and the extremities should always be kept warm.

The second object of treatment is "to improve, or maintain unimpaired the mental health," and the whole may be summed up in this phrase, as applicable to the mind as the body—exercise without fatigue. All mere emotional excitements should be shunned, but whatever occupies and interests without exhausting is beneficial. In a few remarks upon the treatment of the attacks, Dr. Reynolds furnishes some illustrative proof of the value of arresting the progress of the *aura* by compression, and refers to the occasional benefits of cauterization as used by other physicians.

On the whole, the impression left upon the reader's mind by the concluding portion of this work will, perhaps, be one of disappointment; for, after the clear and cogent demonstrations of the preceding divisions relative to the pathological history of epilepsy, one cannot avoid anticipating an equally satisfactory exposition of the cure. But the brevity of this portion is perhaps not one of its least recommendations. There being little to say, the author wisely said but little, but yet enough to show that there is no specific for epilepsy, nor even any certain method of cure; that on the contrary, the disease will most frequently continue, although its violence may be mitigated and its victim's life be rendered comparatively comfortable by a due attention to the laws of health. A. S.

Art. XIV.—*Traité de Chirurgie Navale.* Par Louis Saurel, Chirurgien de la Marine, Professor agrégé à la Faculté de Médecine de Montpelier, Correspondant de la Societe de Chirurgie de Paris; Suivi d'un resumé de leçons sur la service chirurgical de la flotte. Par le Docteur J. Rochard, Chirurgien en chef de la marine, Professor à l'Ecole de médecine navale du port de Brest, Officier de la Legion d'honneur. Illustré de 186 planches intercalées dans le texte. 8vo., pp. 592, + 104. J. B. Ballière et Fils. Paris, 1861.

Treatise on Naval Surgery. By Louis Saurel, Surgeon of the Navy, &c., followed by a summary of lectures on the surgical service of the fleet. By Doctor J. Rochard, Surgeon in Chief of the Navy, &c. &c. Paris, 1861.

The practical application of the principles and art of surgery to the treatment of wounds and injuries and certain maladies when they occur on board of ships of war constitutes naval surgery; and so the application of the same principles in the management of wounds and certain diseases when they occur in an army constitutes military surgery. The principles and art of surgery, whether practised in ships of war, in an army in the field, or in civil life, are the same. In an army and in a navy, the surgeon is often forced to resort to measures and means in caring for his patients which circumstances suggest; but which are or should be always consistent, nevertheless, with the broad principles taught in the schools.

The work of surgeon Saurel might be cited in evidence of the remark just made. It is a very simple summary of the mode of treating the wounds and injuries most frequently occurring on board ships of war, according to received principles. And although he states the causes of contusions and wounds and fractures—consisting chiefly in the unsteadiness of the ship, which render men who climb the rigging liable to fall, and those on the decks to be injured by the falling or tumbling about of various objects which, even with every precaution, sometimes break loose from their fastenings, in storms especially—he offers no suggestion to guide us in the management of cases which, from the constant motion of the ship, he declares to be often very difficult. He tells us that the operation for the relief of strangulated hernia may become necessary, even during the prevalence of a gale; but, although he declares it to be difficult for the surgeon and hazardous to the patient, we look in vain for instructions upon the mode of securing both patient and surgeon during the operation against the violent rolling or pitching of the ship. He might have added that the use of a trephine on the skull may be necessary while the motions of the vessel are so great as to render locomotion upon the decks very inconvenient, if not difficult and hazardous, even to people experienced upon the sea. But such operations have been and can be safely accomplished, even under such unfavourable circumstances, by fixing both patient and operator in such manner that they will be simultaneously affected by the alternating movements of the vessel.

Surgeon Saurel tells us that patients with fractures cannot be treated in their hammocks, and that the iron bedsteads supplied to the ship's hospital, in the French navy, are objectionable, because, being fixed to the deck, they

partake of all the motions of the vessel. The nautical cot, used in the British and American navies, answers tolerably well, provided that the patient, with a fractured lower extremity, is dressed before the cot is hung up where it is to swing. He urges that fractures occurring on board ship should be reduced at once, and the permanent dressings be applied, because the surgeon receives the patient immediately after the accident, before swelling can occur. He also is of opinion that a double inclined plane is not applicable to the treatment of any fracture of the thigh occurring on board ship.

In the year 1853, a work entitled "Naval Surgery, or Clinical Studies of the Surgical Diseases most commonly observed on Board of Ships of War, by Louis J. Saurel, D. M. M., &c.,"[1] was published, and is referred to in the publisher's preface as the first edition of the present volume, which the author did not live to finish. Had he lived, it is probable he would have given us his views on the points which have been ably discussed in that part of the work for which we are indebted to Dr. Rochard.

The summary of the lectures on the surgical service of the fleet, by Dr. Rochard, is valuable and suggestive.

The military marine, he says, is created for combat. That is its chief mission, and to that end all the elements of its organization should tend. The care of the wounded in time of war is among the most important of the duties imposed upon naval surgeons, and is at the same time the most difficult. Afloat, as well as ashore, war has exigencies before which everything must bend, and which often oppose insurmountable obstacles to the accomplishment of their functions. Then they need as much resignation as devotion, as much self-possession as experience, to rise to the height of their mission.

The difficulties in the navy and the army are not the same. They consist chiefly, after a battle, in the number of wounded, the extent of ground over which they are scattered, and the insufficiency of the means of transportation; in the navy, on the contrary, it is the crowding which embarrasses surgical service after a fight at sea. The position of the wounded sailor is better than that of the soldier. He has no apprehension of remaining in the rear and falling into the hands of the enemy; he is not obliged to submit to long hours of anguish, waiting for assistance; he is always sure of shelter, and, however murderous may be the contest, the number of surgeons and resources on board are almost always sufficient to meet all demands; but these conditions, favourable as they are to the individual, are embarrassing for the service. On land the number of wounded never incommode manipulation; afloat they necessarily trammel the surgeon's movements. In the narrow space into which so many men and so much material are crowded, the deficiency of space is a permanent difficulty. The combat, and the injuries caused by the fire of the enemy, always bring a certain amount of disorder, which is enhanced by the presence of the wounded. At all hazards they must be promptly removed from the batteries which they encumber. It is not a question of humanity only; their presence interferes with the manœuvres of the artillery, and produces a depressing effect on

[1] Chirurgie navale, ou études cliniques sur les maladies chirurgicales que l'on observe le plus communément à bord des batiments de guerre, par Louis J. Saurel, D. M. M., ex-chirurgien de 2e classe de la marine, membre de la Société de Médecine-pratique de Montpellier, etc. 8vo. pp. 312. J. B. Ballière. Paris, 1853.

the moral tone of their comrades. Whatever may be their number, they should receive immediate care, and be put in a place of security, and on beds of some kind, until the end of the action.

Three conditions are indispensable to attain this result:—

1. An easy way and convenient means of transporting them to the hold or to the berth-deck.
2. A sufficient space for urgent operations and first dressings.
3. A locality sufficiently spacious to spread out mattresses to receive them afterwards.

These conditions are readily obtained when the wounded are few, and succeed each other at long intervals; but such cases are exceptional. When a fourth or a third of a crew of from 600 to 1000 are wounded in the course of a few hours, as has happened, it is very different.

The passing of wounded men below in sailing ships presents few difficulties. In single decked ships the hold is shallow, and there is not much space for the accommodation of wounded men during an action; but vessels of this class are not, generally speaking, liable to have a large proportion of wounded. The large hatches of frigates and ships of the line facilitate the transportation of the wounded, and on the berth-deck and orlop there is usually abundant space for the spreading of mattresses. But in steamers it is different. Although the hatches are numerous, they are comparatively small. The engines and coal bunkers occupy so much space in the centre of the vessel, that it is very difficult to make suitable provision for the reception of wounded men in the hold. In illustration of these points there are given diagrams of the plans of the holds and berth-decks of the several classes of ships.

Ships at anchor attacking fortresses suffer comparatively little. Of French frigates exposed to the fire of 116 pieces of cannon, distant four cables length from San Juan d'Ulloa, the Iphigenie had 5 killed and 30 wounded, and the Tanger, Magador, and Salé suffered still less. At Petropaulowski the frigate Forte had but 8 wounded. On the 17th October the French and English fleets before Sebastopol, at an average of seven cables length distance, sustained the fire of 316 pieces, most of them of large calibre, served by good gunners, for five hours, and at the end of the action, the 24 French ships, 12 of which were of the line, had 30 killed and 181 wounded in all, and the English 44 killed and 266 wounded.

Under such circumstances the wounded come at long intervals. Inasmuch as the batteries of one side only are engaged, the opposite affords space for the withdrawal of the wounded from the guns in action.

When an engagement takes place under sail or steam, the batteries on both sides must be kept clear, and the wounded must be taken below at once.

In the exercise at quarters in time of peace, it requires at least four minutes to pick up a man supposed to have been wounded near a gun, carry him to a hatch, secure him to a cot, and pass him below. Then the ship is tranquil, and every body preserves his self-possession. But it may be supposed that amidst the smoke, din, and confusion of battle, it would require a somewhat longer time to move a man seriously wounded. Now, if only 50 men are wounded, and allowing four minutes to transport each to the hold, three hours would be occupied in their transportation; and during all this time the guns are encumbered and the gunners cannot manœuvre their pieces without the chance of trampling upon their wounded

comrades. And if the number should be increased through the effects of the newly contrived explosive projectiles, the condition is worse. Hence, it seems indispensable that means should be devised of more rapidly removing so bloody a spectacle from view of the combatants.

It is suggested that when it is probable a battle will be serious on board of a steamer, two passages from the deck below should be established for the wounded; one forward, and another towards the stern of the vessel.

As means of transportation, a cot or frame, fitted by ropes and blocks in a hatchway, so that it may be readily lowered with a wounded man strapped to it, is proposed, but objected to because of the difficulty of guarding it against extensive oscillations impressed upon it by the motions of the ship. A battle-chair, so arranged that it may be lowered by a pulley, is also suggested. But it is very questionable whether the arms of a strong man may not afford a better and more expeditious means of transporting a wounded man than any contrivance hitherto proposed.

As in steamers, generally speaking, the engine divides the forward from the after part of the vessel, it becomes necessary, when two routes for the conveyance of the wounded are established, that the surgical force should be divided and posted at two points, the surgeon being at one and the senior assistant in charge of the other, both well supplied with the necessary instruments and appliances.

A place for the deposit of wounded men during action is difficult to find in steamers. It is suggested, to meet the exigency, the bag-rack on the lower deck should be constructed of iron bars, so arranged that mattresses would be spread upon them, and then, on beating to quarters, the bags should be stowed in any empty coal bunker.

Certain preliminary arrangements are to be made before battle. The distribution of tourniquets in the tops, required by an English regulation, may be dispensed with in steamers, for the reason that these vessels furl their sails before going into action, and very few, if any, men are kept aloft. But there should be *garrots* supplied to men at the guns. The writer of this notice submits that an efficient instrument consists of a piece of wood, five or six inches long, a half inch in diameter, turned with a slight rim at either end, near one of which is attached, by a clove-hitch, a piece of roller three feet and a half long, and two and a half inches wide, so that the stick may be about fifteen inches from one extremity, and, of course, twenty-seven from the other. This simple instrument is applied thus: the fillet is passed around the thigh, or arm, as the case may be, drawn tightly, and tied about six or seven inches from the stick; the free ends, which are sufficiently long, are employed for securing the stick after it has been used in twisting the fillet to the degree of tightness necessary to arrest the hemorrhage. A fillet or ligature passed round a limb may be made tight enough to stop the flow of blood, by twisting with a stick; but after this point is gained, one may be very much at loss for means of preventing the band from untwisting the instant the stick is abandoned; the simple instrument just described, is proposed to obviate the difficulty on this point.

Surgical dressings, &c., arranged in two boxes or trays, with suitable divisions, should be deposited in the dispensary, ready to be taken to each of the two appointed stations of the medical officers.

Dr. Rochard gives, in a note, in detail, the quantities of various articles which may be needed, on board of a ship of the line, whose complement is 1087 men.

Dressings prepared, on a first-rate ship of the line, on the eve of battle:—

Apparatus for amputations, including compresses, rollers, &c., in the same number.	For the arm	5
	" forearm	10
	" thigh five	5
	" leg	10
Bandages for fractures, different splints, graduated compresses, &c.	Thigh	4
	Leg	8
	Forearm	8
Bandages for the hand and foot.	Bands for fingers	48
	Slings for the heel	18
	Splints for fingers	18
	Pads, for the hand	6
	Pads, " foot	6
Bandages for the head.	Bandages (Galen's)	8
	Triangles	18
	Chin-pieces	18
	Slings for the chin	18
Bandages for the chest and shoulder.	Bandages for the body	24
	Scarfs or bands	18
	Cushions or pads for clavicle	4
Bandages for the abdomen and pelvis.	Spica bandages	6
	Triangular "	12
	Square for the groin	12
	Perineal or T	12
	Suspensories	12

For external use, cases not specified, rollers, compresses, &c., in sufficient quantities. Charpie opened, and in pledgets. Sponges. Waxed threads, single and double. Rolls of adhesive plaster. Strips of diachylon, of different sizes. Agaric. Resin, in powder. Garrots. Sharpened pins, for sutures.

Each bandage is made in a separate parcel, and labelled; those of the same kind being placed together, in a compartment of the box or tray.

For internal use, bottles of	Ammoniæ liq.
	Brandy.
	Camphoræ tinctura.
	Ether. Chloroform.
	Ferri-persulphas.
	Laudanum. Vinegar.
Earthen vases of	Plumbi acetas.
	Cerate.
	Olive oil.

In addition to the above—

Plates and shells of tin	2
Goblets	4
Candles	2
Bucket filled with sand	1
Buckets " fresh water	2
Brooms and swabs	2

To these may be added two or three tin basins, and a half dozen towels.

The surgeon should take care that the steward, nurses and other attendants are instructed, and that each one understands exactly the nature and extent of services required of him, so that at the moment of need the work

may be executed in a neat, orderly manner without loss of time, or confusion of any kind.

When the order is given to assemble at quarters the drum-beat gives the signal.

On board French ships the first care is to evacuate the hospital, and have those patients who are confined to bed conveyed below, and those not capable of performing duty at the guns are to be stationed in the hold to assist their wounded comrades, by supplying them with water to meet the demands of traumatic thirst, which is terrible in cases accompanied by great loss of blood.

In sailing ships of the line, after the hospital has been cleared, the second and fourth surgeons, aided by the officers' servants, spread mattresses and covers proportioned in number to probable exigencies. The chief and third surgeons set up and arrange the operating table in the hold, and make sure that buckets of sand and fresh water and swabs are at hand.

In steamers, the principal post occupied by the chief and third surgeons should contain the operating table, and instruments and dressings placed so as to be at hand. A weak mixture of wine and water in sufficient quantities, with goblets for the use of the wounded; buckets of water, sand, and swabs should be provided, and everything secured against the motions of the ship. The chief surgeon should also take care that there is sufficient light supplied by lamps, lanterns, &c.

The station of the second surgeon, at the opposite end of the ship, is to be provided and prepared in like manner.

Having seen that all his orders have been executed, the chief surgeon then descends to his post, which he is not to leave, except by express order of the commander of the ship.

At the moment when firing is about to commence a profound calm reigns throughout the ship. Motionless expectation succeeds the tumult which immediately followed the drum-beat to quarters, and silence takes the place of noise. The moment is serious. Every one feels a necessity of collecting himself, and memory is busy with the past. The first broadside cuts short reflection, and every one thinks only of his duty. That of the surgeon is not the least painful. The emotions of the combat, and the excitement attending success, are equally unknown to him. He is ignorant of what is transpiring on deck. He judges of the greatness of the contest only by the horrors of its results; he cannot conjecture the issue. Bent beneath the beams in his narrow retreat, where the want of air, space, and light are simultaneously experienced, seeking by doubtful illumination in a stifling atmosphere to extract a projectile or to cast a ligature about an open vessel; sometimes overborne by the rapidity with which the wounded succeed each other, he must preserve, amidst the scene of carnage, the self-possession of the physician and the calm of the chief of his department. The execution of these austere duties is not always exempt from peril. Surgeons are classed as non-combatants in the division of the advantages which inure to success of the fight, though they do not always escape death.

If, says Dr. Rochard, the navy should be called upon one day to renew the grand contests of past times, the means of destruction are now such as to equalize the chances of all, and where there is an equality of danger there should be an equality of glory.

Operations requiring much time are rarely necessary during the engagement, and indeed it would be imprudent to attempt them. The surgeon's

attention is to be given to urgent cases, and to the dressing of slight ones, that they may return to the deck. After the firing has ceased, he has to complete his labours, attend carefully to every case, and arrange his hospital.

The question of amputation under different circumstances of injury is judiciously discussed. He concludes that in compound and complicated fractures amputation should be the exception and not the rule of practice.

If after a battle, while the decks are occupied by many wounded, bad weather should supervene, and require the closing of the ports, we may expect from humidity, and a vitiated atmosphere consequent upon reducing the means of ventilation, unfortunate complications. The danger augments with the number of wounded. To the ordinary causes of the vitiation of the atmosphere are added the emanations from extensive suppurating wounds, some of them complicated with gangrene.

Deficiency of air, humidity, and miasms are three foes to the surgeon's efforts which must be guarded against. If the weather is fine and dry, and the ports can be kept open, there is little to fear; ventilation takes care of itself, and guarantees salubrity. Under opposite circumstances precaution is indispensable, and sometimes no degree of care is enough to avert the danger.

It is to be hoped that some system of ventilation for ships may be devised which will afford a ready means of furnishing abundant supplies of fresh air to the most profound and remote points of their structure. A forced ventilation in steamers ought not to be difficult to accomplish, and at a cost of very little power. In the absence of such contrivance, wind-sails and drying-stoves must be substituted. The former should be at every hatch, and fires in the latter should be constantly lighted and distributed at regular intervals among the beds; and beneath those from which the most offensive smells emanate broad vessels containing chloride of lime, slightly moistened, should be placed.

The maintenance of an unexceptionable degree of cleanliness is most important; but care should be taken that it be not attained at the cost of profuse and frequent washings. These should be proscribed when the weather is damp, or when the ports are closed. The broom and dry holystone should suffice for general cleaning, with the application of a *damp* swab to very dirty spots. And at all times hot fresh water, rendered slightly alkaline by an admixture of wood-ashes from the galley fires, is to be preferred while wounded men are on the decks. As a means of lessening the necessity of washing, canvas cloths might be spread between and around the beds during meals, for the purpose of receiving and removing immediately after, scraps of food dropped.

Dressings should be renewed twice daily, and parts of apparatus should be changed whenever they become imbued with liquids discharged from wounds. Small pieces of dressings, charpie, &c., when removed, should be at once thrown overboard, and large bandages, compresses, &c., should be immersed in buckets of sea-water and speedily removed to the place designated for washing them in fresh water. Wounds should remain exposed to the air no longer than is absolutely necessary to dress them. When the wounded are detained on board during a considerable period, whitewash, containing a little hypochlorite of lime, should be applied to the neighbouring wood-work from time to time.

Do what we may, any considerable number of sick on the lower decks of

a ship is never free from danger. The most serious cases should be allocated in the most airy situations, and those capable of locomotion should be required to pass the greater part of the day on the spar deck, when the weather is favourable. Exposure to the open air, the vivifying influence of sunlight, sight of their comrades, and the change of scene produce the happiest effects upon their moral and physical condition, while their absence from the sick-quarters diminishes the crowding. On the other hand, in high latitudes, it may be necessary to send these cases to the berth-deck to shelter them from the cold, and from currents of chilling air. After the affair at Petropaulowski the French division went north, and four of the wounded, from the cold of the nights especially, were attacked with tetanus and died. No cases occurred after the wounded were removed to the berth-deck.

The diet of the wounded should receive particular attention. After a naval engagement the conditions in which they are placed are debilitating, and therefore a substantial and reparative regimen is the best calculated to protect them against threatened complications.

A chapter is devoted to the consideration of the preparations necessary to be made by the medical officers who accompany boat expeditions and parties landing to attack strongholds on shore. There should be provided a strong tin case, covered with leather, of the dimensions and form of a knapsack, with drawers and compartments, to contain surgical instruments, some short splints, lint, sponges, rollers, adhesive plaster, simple cerate, thread, sewing needles, dressing pins, wax, sulphate of quinia divided into powders or pills, a glass cup, a tin or leather goblet, candle and candlestick, laudanum, ammonia, vinegar, tincture of camphor, brandy, &c. The liquids should be in strong glass bottles, each one packed in a separate drawer. This case may be strapped upon the back of an attendant who accompanies the march. The surgeon's position in the field may be marked by a yellow flag, and the hospital boat, or ship, as the extent of the expedition may suggest, may be designated in the same manner.

It is well to provide litters for the transportation of the wounded. Two shafts or poles, about the length of a boat-hook, ferruled at the extremities, one of which may be sharp, like a boarding-pike, and serve to repel enemies in case of need, having a piece of canvas, about six feet long and two and a half wide, fitted so that it may be attached to the poles by grummets, are readily converted into a litter, with the assistance of a couple of stretchers. In an extemporized litter of the kind a wounded man may be carried easily by four men, or even by two. If obtainable, the shafts may be made of stout bamboos, which are strong and comparatively light.

We have many valuable suggestions in this chapter, and interesting notices of several boat expeditions in which the French have been engaged or taken part. But enough has been said to indicate the nature and scope of the volume which we cheerfully commend to the younger medical officers of the navy.

W. S. W. R.

ART. XV.—*Lectures on the Germs and Vestiges of Disease, and on the Prevention of the Invasion and Fatality of Disease by Periodical Examinations.* Delivered at the Royal Infirmary for Diseases of the Chest. By HORACE DOBELL, M. D., &c. &c., Physician to the Infirmary. London: 1861. 8vo. pp. 198.

A TRULY philosophical endeavour to analyze the facts of medical experience should always be welcomed by the profession. It is no unwillingness to reason, or want of confidence in the value of careful ratiocination, that induces many of the best medical minds of the present time to rank themselves, as therapeutists, under the banner of methodical empiricism. Not all going so far in opposition to rationalism as to believe with Trousseau that this necessarily "ne conduit qu'à des sottises," they must, upon the very basis of induction, admit and honour all efforts towards the classification and generalization of medical facts. Of the results of such efforts, however, there has been a lamentable deficiency in the science and literature of practical medicine. The natural history of disease has been but vaguely studied, and taught according to routine and dogma. The want of a sound medical philosophy, or even philosophical method of study in medicine, is thus, to speak boldly, hardly better met than in the days of Celsus or Aretæus. We believe it to be impossible to apply at present, upon any extended scale, the recognized truths of physiology to the immediate purposes of the physician in the treatment of disease; but the biological or naturalistic *method of investigation* of the facts both of morbid or perturbed physiology, and of therapeutical experience, must be approved, and should be adopted.

It is for the apparent honesty of his effort in this direction, quite as much as for the degree of his success therein, that the work of Dr. Dobell appears to us to be entitled to very attentive and respectful consideration. His subject is one which must interest every thoughtful physician. The occasion of its having occupied his mind so far as to lead to the preparation of this work, may be best understood from his own statement:—

"When I commenced private practice, I had devoted more time to the study of medicine in hospitals and medical schools than most students have at their disposal; in addition to which I had read nearly every medical and surgical work of good repute, ancient and modern. And I naturally expected to find myself quite at home with any cases which might present themselves in private practice. To my surprise and disappointment, however, I found myself surrounded by complaints which appeared quite strange to me, and I kept vainly hoping that each new case might be placed under one of the well-known heading so familiar to me in the hospital-ward, the out-patient room, the book, or the lecture theatre, and the management of which I had so carefully learnt.

"Cases of pneumonia, apoplexy, variola, fever, or the like, were positively refreshing, when, from time to time, they came in their well-known features. But these were few and far between; whereas I found the principal part of my time occupied with diseases or states of health for which I could find no special names, and for which I had learnt no plans of treatment."

"Many years after the period to which I refer, an article appeared in the *Times* newspaper, just at the time that I was engaged in making notes for these lectures, which appeared to be so apposite that I placed it with my notes, as full of interest and meaning."

The following is part of the article referred to:—

"What is it that is worse than a sweating sickness, or a plague, which comes with a bale of Turkish goods, and goes with a great fire, which wears itself out, and leaves no record but in story, which old men may describe to wondering grandchildren, and which doctors may now set down as an individual and extinct type of disease? *It is not disease, but it is not health.* It is a low state of vitality, of physical power, of mental energy, of enjoyment, and even of moral strength. . . . . Shocking as it may seem, a plague once in twenty years seems but a light evil to so low a condition of humanity."

"These remarks are directed chiefly to the very poor; but it is not they alone who suffer from states of health here so forcibly portrayed. Many of the conditions of *low health*, and of anomalous disease to which I have referred, are more frequent among the well-off than among the poor." (pp. 30–32.)

The plan of the author involves a scrutiny of the very foundations of the theory and practice of medicine. His first lecture opens with the announcement of a medical creed, in the following terms: 1. That man may be the instrument through whom the invasion and progress of premature destructive changes in the human organism may be prevented or arrested. 2. That man may be the instrument through whom the damaged organism may be more efficiently repaired. 3. That man may be the instrument through whom the sufferings of the human being may be alleviated. The justification of medical practice requiring a belief in these articles, it is rightly considered that their truth should be first well established as the basis of any system of therapeutical doctrine.

The third article is too familiarly attested to need much remark. The first and second, concerning the aid man may give in promoting the repair or preventing the destruction of the organism, must be considered in view of the results of investigation of the *capacity of the organism itself to effect these ends without the instrumentality of man.* This investigation must be prior, in a logical sense at least, to therapeutical experimentation. Dr. Dobell, therefore, gives it his first attention; occupying with it the whole of the first two lectures.

Facts in comparative physiology are brought to bear upon the laws of *production, repair,* and *reproduction* of the human organism. The greater portion of these facts is collected by our author in an appendix; where the reader may study at length numerous examples, from all divisions of the animal kingdom, of spontaneous recuperative power.

The general law which the author thinks himself justified in inducing from these well authenticated examples, is thus expressed: "At every period of an animal's life, the force manifested in production, maintenance, growth and repair, and reproduction, is sufficient in every respect, and determined in that direction, essential at the time to the attainment of the *ultimatum.*" The term ultimatum here means merely the consummation of the design with which the animal appears to have been formed. In the insect, neither the larva nor the pupa has attained the ultimatum; nor can the imago be considered to have done so, until it has secured the multiplication of the species, in the fecundation of the necessary number of ova. In man, the ultimatum of existence is not bounded by the same limitation, but includes still higher functions.

The point of especial interest in the application of this law is the determination of force at each epoch of the animal's career, in that *direction essential at the time* to the attainment of the ultimatum. The individual is, however, throughout the animal kingdom, subservient to the *species:* and our idea of the ultimatum must be extended to the species. If the

career of an individual of any species be cut short, it does not necessarily follow that the law for the attainment of the ultimatum has been violated.

The determination of reproductive and reparative force to the restoration of that part the permanence of which at a particular time is a condition of the animal's existence, and which is, by the circumstances of its life at that time, most subject to injury, is beautifully illustrated in Hydriformia, Asteriæ, and Cirripedia. Dr. Dobell quotes the following from Darwin:—

> "In cirripeds, the larvæ in the first stage have three pairs of legs, a very simple single eye, and a probosciformed mouth, with which they feed largely, for they increase much in size. In the second stage, answering to the chrysalis stage of butterflies, they have six pairs of beautifully constructed natatory legs, a pair of magnificent compound eyes, and extremely complex antennæ, but they have a closed and imperfect mouth and cannot feed; their function at this stage is to search by their well-developed organs of sense, and to reach by their active powers of swimming, a proper place on which to become attached and to undergo their final metamorphosis. When this is completed they are fixed for life. Their legs are now converted into prehensile organs, they again obtain a well-constructed mouth, but they have no antennæ, and their two eyes are now converted into a minute, single, and very simple eye-spot."

Among vertebrated animals, the power of reproducing lost limbs is bestowed most largely upon the salamander, an animal of predatory habits, and living among carnivorous feeders. In the land lizard, the tail is at once a means by which it is apt to be captured, and its instrument in eluding its pursuers; and a power to disengage it from itself is coupled with an extraordinary facility in reproducing the lost part. The fish requires the persistence of the fins as a condition of its existence, and they are peculiarly exposed to injury, from constant use and from the attacks of enemies; the power of repair is, accordingly, especially determined to them.

Now, what, in man, is the special direction in which reproductive and reparative energy is determined? After birth, at least, there is no instance on record of even an attempt at the restoration of a lost human limb; although supernumerary fingers have sometimes been reproduced after removal. But Dr. Dobell insists that this non-reproduction of limbs comes from no want of the force necessary to restore them, if it were a *condition of our existence* that they should be so reproduced. The occasional reformation of a whole bone, and the cases reported by Dr. Simpson of the renewal, although imperfect, of limbs spontaneously amputated in the fœtus in utero, testify to the existence of this capacity, latent, as it were, in the higher vertebrata.

The study of the conditions of existence of the highest animals, will inform us of the direction in which reproductive energy is exhibited in them. As we ascend the scale, we find most remarkable advances in the development of *intelligence*, and in the complexity and delicacy with which organs are *correlated*. By reason of the former, man is much less dependent than the lower animals upon the possession of his external members.

With increased complexity and delicacy in the correlation of organs, comes a proportionate increase in the importance and difficulty of keeping them repaired. The influence of a highly and delicately organized nervous apparatus upon susceptibility to disease is illustrated to some extent even in the domestic animals; although much more largely in man.

It may be properly urged, then, that in man, a continual reproduction is going on, of those parts most necessary to the conditions of his existence, or "the necessities of the ultimatum." This is seen in the formation and re-formation of blood-corpuscles, of the secreting cells of glands, and of

cuticular epithelium. The alterations in the size and activity of bloodvessels following upon obstruction or injury; the increase in the number of fibres of the muscular tissue of the heart or bladder when extraordinary resistance is to be surmounted; the occurrence of vicarious secretion, and other examples, are dilated upon by our author, as showing how the vital energy in man is especially determined towards the *preservation of completeness in the complex correlations of his organism*, amidst the no less complicated dangers by which it is surrounded. Paget is quoted as confirming this view by the statement given by him of the limits of reproductive power in man and other mammalia. These include only "the blood and epithelium," "the gelatinous tissues, cellular and tendinous tissues and bones," and "those which are inserted in other tissues, not as essential to their structure, but as accessories, as connecting or incorporating them with the other structures of vegetative or animal life; such as nerve-fibres and bloodvessels." All of these are important to those correlations of organs which have been alluded to. As Dr. Dobell remarks, the organs which cannot be so perfectly restored are either such as are seldom entirely removed without the death of the individual, or such as are provided with duplicates endowed with the power to assume a complemental function, or such as are competent in themselves to compensate for loss of a part by augmenting the functions of the remainder.

Beyond this, however, the human organism is also subjected to dangers other than those included in *solutions of continuity*: by *poisons*, organic and inorganic, and by the whole army of influences commonly classed as causes of disease. To what extent, it becomes necessary to ask, is the animal body capable of preventing the invasion and resisting the progress of premature destructive changes, without the intervention of man? The simplest example of this is afforded in the introduction of an inorganic poison, as arsenic.

Arsenic and other poisons are *disposed of*, so as not to be injurious, as we know that a poisonous dose may be given with impunity, if divided into several parts and given at certain intervals. How, and within what limits, then, is it, that the organism disposes of poisons, for its protection against their power?

This forms the first subject of Dr. Dobell's second lecture. The method of disposal of poisons introduced into the economy is best understood by reference to the normal excretory processes. These remove substances which, if remaining, would prove essentially poisonous. Dr. Richardson has illustrated this in his experiments upon the injection of lactic acid into the peritoneal cavity of animals. The balance of excretion and secretion, with nutrition, is indispensable to health.

"When, however, this balance is disturbed, some matter essential to the constitution of some other matter becomes deficient, or some matter collects in undue quantity, and, in either case, other organs and functions than those primarily involved are drawn into the service of the organism, to restore, if possible, the balance thus disturbed. And when we bear in mind the important fact that the normal constitution of any one part is dependent on the normal constitution of all the rest, we shall at once see how easily imperfectly formed elements of nutrition may be generated in the organism, with all the features which we are accustomed to recognize as disease. How complicated may the processes become! How complex the outward manifestations! Or, again, how simple! For all that may attract the physician's observation may be the last scene, successful or unsuccessful, in the attempt to get rid of a redundance or to supply a want." (p. 25.)

As to the limits within which vital energy, or, as our author prefers to call it, the "vitalized mode of force," can act successfully in arresting the destruction of the organism, no rule can be definitely laid down which will apply to individuals. It must be admitted that the human being *may*, unaided, live through injury, through disease, through almost anything, *under favourable circumstances*.

These last three words confer, or constitute, to use our own words, the physician's license to practice. How seldom are the circumstances absolutely and perfectly favourable! If they were, our vocation would indeed be a sinecure. Not being so, the manifold and most important influences of circumstances upon the manifestations of vital energy must be carefully studied, to afford answers to the great although simple questions, what is there for the medical practitioner to do, and how ought he to do it?

Dr. Dobell asserts here the very important proposition, "that the vitalized mode of force may be altered in its attributes of quantity and quality by numerous causes." This involves a discussion, succinctly gone into by the author, of the doctrine of force, and the correlation of physical and vital forces, as modes of motion, expounded by Grove, Carpenter, and others. As all the knowledge we have of different modes of force is inseparably connected with different modes of matter, it is concluded that the "necessary concurrent modes of matter" are, as regards force, the "conditions of its existence." Changes in the modes of matter connected with vital force must subject it to changes in its attributes or manifestations.

The view maintained by so many physiologists, that the amount of vital force with which each individual organism is endowed is a limited quantity, a portion of which is "expended" in development, growth, and maintenance, so that "reparative power bears an inverse ratio to the amount of force already consumed in these processes," is contradicted by our author. Let us give his ground of opposition to it the benefit of his own statement.

"According to the most recent statistics employed by actuaries, it may be calculated, that out of every 100,000 children born, only 63,296 reach the age of twenty-five years: 36,704 dying from various causes before that age. If each of these 63,296 individuals has, at the age of twenty-five, produced one child and $\frac{7}{12}$ths, the number thus obtained will be only a fraction more than is sufficient to compensate for loss, and to bring the population up to the original quantity. In order, then, to keep up the population, the vitalized mode of force with which each individual was endowed at birth must have accumulated at least $\frac{7}{12}$ths during life, instead of wasting, expending, or being consumed; otherwise, the individuals of each successive generation would be endowed with a smaller quantity of force than their predecessors. And as, so far from the population being only maintained at a fixed quantity, it increases at a great rate, the accumulation of vital mode of force must be proportionably great, to fulfil this necessity of organic existence, we discern—or at least such is my hypothesis—that every living thing is given, 1st, a certain *endowment of vitalized mode of force*, with which to begin its career; 2dly, *accumulators* of fresh force, the amount which it can thus accumulate being regulated only, *cæteris paribus*, by the requirements of the ultimatum." (p. 42.)

No question in biology is more interesting, and perhaps none more extensive in its bearings, than that which is thus opened before us. It would be quite impossible to do justice to its consideration within our limits. We must say, however, that the hypothesis abovestated appears to us to be entirely gratuitous. It may be readily granted that there is no evidence anywhere of the annihilation of force, any more than of matter; that what is, or should be, meant by such expressions as loss, expenditure, or consumption

of force, is merely the determination of force into other modes or directions, *i. e.*, its conversion or devolution into other kinds of force. But, in this sense, we know that there is a limitation to every special impulse in the dynamics of nature. We know that all terrestrial life, in each individual, tends to certain death, at or near a definite period. We believe that the only ascertained *accumulator* of vital energy belongs not to the individual, but more properly to the species; being the conjugation of the sexes, the union of the sperm-cell and the germ-cell. This view requires the admission of the truth of Carpenter's assertion, that "between generation and development (including budding) there would seem to be a kind of antagonism. Whilst every act of development tends to diminish the germinal capacity, the act of generation renews it."

But this does not prevent the conditions of life, or "concurrent modes of matter," from exerting a marked influence upon reproduction and its results, as well as upon individual vital energy. Dr. Dobell's hypothesis is not necessary to his own conclusions. He remarks, very truly, that Darwin has not, in putting forward his theory of "natural selection," done full justice to the "conditions of existence," as affecting both the individual and the species. There is no difficulty in assenting to our author's conclusions upon the subject at which we have been glancing, as follows:—

"That the vitalized mode of force may be altered in quantity and quality by numerous causes.

"That these causes may affect either the existing individual, a succeeding generation, or both.

"That these causes are, *principally*, the *vestiges* of disease, existing or *coetaneous* diseases, and the *conditions of life*."

"The effects of injury or disease and the manifestation of the vitalized mode of force in protecting, restoring, or repairing the organism, depend upon the relation which exists at the time between the following conditions:—

"α. The position of the animal and of the part affected, at the time, with respect to the attainment of the ultimatum.

"β. The state of the part affected, and of all correlated parts.

"γ. The state of the conditions of life at the time.

"δ. The quantitative and qualitative state of the vitalized mode of force." (pp. 47–8.)

We are thus brought to the more practical part of the volume; which introduces the study of the vestiges and germs, or the "wells and springs" of disease, by an animated account of "a day's practice." A number of chronic cases, and a few acute ones, are described, to illustrate the connection of the occurrence, severity and mortality of diseases with the previous medical and hygienic biography of the individual. Here we begin to be somewhat painfully reminded of the great gulfs of difficulty which pathology presents, and which no theory, or, so far, induction has been able to bridge over with other than merely temporary structures. The first case, very graphically narrated, is one of nervous disorder; in which the diagnosis is made, that the patient is "saturated with the poison of rheumatism." The second is that of a corpulent old lady, "teazed to death with erysipelas," or rather eczema, of the ears and sides of the head, with other complaints. A strict examination leads to the "discovery that she is saturated with the poison of gout, or rheumatism, most probably gout, which is acting as the germ of several forms of disease."

Now, what is rheumatism, and what is gout? And what is that poison, or what are those poisons, with which these patients were saturated? How that "*most probably*" interferes with the equanimity of our self-gratulating

inductive medical philosophy! Probably enough, the diagnosis may be correct; although it does not follow so necessarily from the symptoms related as our author's confident expressions might seem to indicate. And, with great *probability*, we may believe that, in the one case, the poison is lactic, and in the other uric acid. But a doubt remains, which is of serious moment to our *ratio medendi*.

It would be extremely difficult to do justice, in a few words, to the remainder of Dr. Dobell's work, which has been carefully thought out, and closely written, so as scarcely to bear further condensation. We commend it to the study of the reader, as containing suggestions, and evolving principles, which, however they may have been before presented, are here elaborated, in a manner well adapted to favour their proper appreciation. The immediate purpose of the remaining lectures is to show how the vestiges of one disease become, in very many cases, the *essential antecedents*, the *predisposing antecedents*, or the *causes of fatality*, in other diseases. This is done by a careful and tabulated etiological analysis of typhus and typhoid fever, apoplexy, paralysis, heart disease, pericarditis, rheumatism, gout, bronchitis, atrophy, and debility. The statistics of the Registrar-General's reports are skilfully made use of, and the very extensive and important interdependence of diseases is satisfactorily demonstrated. A similar exhibition is then made of the importance of *anæmia*, of *syphilis*, and of *fatty degeneration*, as vestiges, and as frequently unrecognized germs of disease, and causes of deaths *registered under quite different names*.

A single example of the first of these series of analyses may suffice to illustrate their nature.

VESTIGES OF ONE OR MORE ATTACKS OF GOUT.	PREDISPOSING ANTECEDENTS TO.	ESSENTIAL ANTECEDENTS TO.	CAUSES OF FATALITY IN.
Deposits of urate of soda in and about joints and some other parts.	Apoplexy.	Heart diseases.	.
Tendency to a return of the attack in the parts previously affected.	Attacks of Gout.		
Anæmia and nervous exhaustion, especially from repeated attacks.	Bronchitis, rheumatic and gouty attacks, typhus.	Atrophy and debility, and do. in offspring.	Bronchitis, rheumatism & gout, typhus, heart disease.

The following passage from Dr. Dobell's last chapter will convey very succinctly his conclusions, and his view of their practical bearing:—

"We have plainly seen that the organism is competent to take care of itself, provided that it possesses a normal vital energy,[1] and is surrounded by normal conditions of life; and we have also seen that the great causes of defect in the vital energy are, the *vestiges of disease and abnormal conditions of life*; and we have also learned that the diseases, from which the vestiges result, are *invited*, by defects of the vital energy; and that when thus invited and received into the organism, they are capable of being disposed of without leaving vestiges behind, if the vital energy is free from excessive defect; that thus these vestiges are due to defective vital energy. And as we have learned that the earliest invasion of defects in the vital energy, upon which all the long and intricate succession of ills depend as their germ—as we have learned, I say, that this state of germination exists at a period anterior to the manifestation of disease

[1] Designated in the work by the symbol V. M. F., or "*vitalized mode of force.*"

in its ordinary characters, and that it is to be found in the garb of slight impairments of the general health, the indications of which are more and more evasive and occult, the earlier the stage of germination; and, finally, as we have learned that *it is in this occult and evasive stage of germination that the defect is most easily and most efficiently to be remedied;* I think you will agree with me in the practical conclusion at which I have arrived.

"That the manner in which man is to exercise his instrumentality for the prevention of disease, the prevention of the vestiges of disease, and the prevention of fatality in disease, is to search out these earliest evasive periods of defect in the physiological state, and to adopt measures for their remedy. This appears to me to be the highest, the most ennobled duty of the physician, calling for the most abstruse knowledge of the science of life, the deepest experience in disease, the keenest exercise of the perceptive faculties, the calmest, most far-sighted reasoning, and the wisest judgment—a duty as much above the management of acute disease as to rule an empire is above fighting a pitched battle." (p. 153.)

Dr. Dobell then proposes to anticipate, in individual cases, the development or germination of morbid conditions, by instituting, as a custom, *a system of periodical examination, to which all persons should submit themselves, and to which they should submit their children.* Having no occasion to doubt that this would be an immense benefit to the *public*, a little more consideration is necessary to enable us to see how it would affect the *profession*.

In order to maintain the interests of medical men, however, under such a system, it would only require to establish such a scale of remuneration for these thorough scientific examinations, as would correspond with their value to patients in economy of health and in lessening the probable need of much intermediate attendance. Of course, the *poor* should be provided for in this arrangement, by the formation of special departments in all hospitals or dispensaries, for the purpose; whereby, as our author urges, a great saving of medicine, now expended in mere *temporary relief*, might be attained.

We believe that this project, novel as it may seem, affords much probability of usefulness. The difficulty of securing its general introduction will, it is likely, be greater with those who are most to be benefited, namely, the public at large, than with physicians. Many, who are excessively anxious about obvious symptoms of disease, prefer to remain obstinately blind to remote dangers or latent evils. It may be very hard to convince these of the value of a preventive examination while they are in tolerable health, or to persuade them to the use of precautions, however timely, which may involve some trouble or self-denial. On the other hand, the medical man, too often tantalized by uncertainties of prognosis, and difficulties of treatment, growing out of the "defective vital energy" and "conditions of life" of his patients, may be gratified to find opportunities for the exercise of his skill and judgment, where certain and favourable results may be almost calculated upon, and where death is not continually knocking at the door. The proposal of Dr. Dobell, then, even if it should not meet with immediate acceptance, is one of so reasonable a character, as to deserve consideration. The thanks of the profession are due, moreover, to its author, for a work, so full of careful and laborious thought, based directly upon assiduous observation, as to constitute an important contribution to scientific medicine. H. H.

BIBLIOGRAPHICAL NOTICES.

Art. XVI.—*Reports of American Institutions for the Insane.*

1. *Of the Butler Hospital, for the year* 1860.
2. *Of the New Jersey State Hospital, for the year* 1860.
3. *Of the Western Asylum of Virginia, for the fiscal year* 1859–60.
4. *Of the State Asylum of South Carolina, for the year* 1860.
5. *Of the Northern Ohio Asylum, for the fiscal year* 1859–60.
6. *Of the Hamilton County (Ohio) Asylum, for the fiscal year* 1858–59.
7. *Of the Asylum of California, for the year* 1858.
8. *Of the Wisconsin State Hospital, for the year* 1860.

1. The principal numerical records of the *Butler Hospital* for the year 1860, are as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year	68	67	135
Admitted in course of the year	33	25	58
Whole number	101	92	193
Discharged, including deaths	33	33	66
Remaining at the end of the year	68	59	127
Of those discharged, there were cured			22
Died			15

"The deaths include but two cases of recent attack. The rest were of persons who had been insane for a considerable period. Among them were four women, aged, respectively, 71, 77, 78, and 93."

The publication before us contains one of those interesting monographic essays for which the reports of Dr. Ray have become remarkable. The subject treated is, as nearly as can well be expressed, the suppression of a hereditary tendency to insanity. We shall attempt, by a great abridgment from the original, to impart a general view of the whole essay.

"The hereditary character of insanity is a fact as firmly established as that of the propagation of certain other diseases by contagion. And, unquestionably, of all the agencies concerned in the production of insanity, this is the most prolific. * * *

"The organic law in question does not imply the transmission of actual disease, but of tendencies to disease; nor is it always in the line of direct descent, nor with any regulated degree of intensity. It may skip over, so to speak, a whole generation, and make its appearance in the next. It may be traced back to its source, not through parents, but through uncles and aunts. It may be overt and unmistakable insanity in the child, and eccentricity or strong peculiarity in the parent; and *vice versâ*. The tendency may be transmitted irrespective of other parental qualities; and the child who bears the features exclusively of the father, may inherit the mother's tendency to disease. It may strike down its victim in the freshness and vigour of youth; it may wait until the mind has stood many a shock, and encountered many a trial.

"The case, however, is one of not unmingled discouragement. Here, as everywhere else, nature mitigates the severity of its laws by compensatory arrangements. The organic condition on which the tendency depends is not invariably transmitted to every child, any more than certain traits of body or mind; or, if transmitted, is endued with so little activity and power as to remain dormant, and become extinguished in the next generation by the overpowering tendencies of a different blood. And even when transmitted in a state of considerable energy, it may often be kept in abeyance by a course of bodily

and mental discipline specially ordered for this purpose. * * * There is reason to believe that many persons, thus unhappily constituted, have warded off an attack of disease, by looking the evil firmly in the face, and resolutely shunning, in their diet, regimen, habits, occupations and amusements, mental and bodily exercises of every description, whatever might be supposed likely to produce unhealthy excitement.

"The first consideration I would urge on this class of persons, is, that a tendency to mental disease is liable to be increased by any derangement of the bodily health. * * * Parents who have reason to fear the existence of hereditary mental infirmities in their offspring, have an additional inducement to watch over their health, to strengthen their bodily powers, and promote a happy balance of the various faculties of the mind. * * *

"Although insanity seldom makes its appearance in childhood, yet it can hardly be doubted that the initiatory step is often taken at this period towards the development of morbid tendencies. * * * In the physical education of this description of children, it should be a prominent object to strengthen the nervous system. * * * Much sedentary employment, much confinement to warm rooms, sleeping on feathers—all improper enough under any circumstances—are peculiarly adapted to foster susceptibilities to nervous disease. * * * On the other hand, considerable exercise in the open air, with some disregard of atmospherical conditions, serves to expend the surplus nervous energies, and thus excite a healthier activity in the nervous system. Upon no class of children does the hot-house management operate more unfavourably than on that we are here considering. Upon no other class of children do labour and exposure, properly regulated, prove more salutary; and parents cannot make a greater mistake than to lavish upon them the tenderest nursing.

"Of more importance, however, than all this, is the mental and moral training—or, more strictly speaking, the education and exercise of the brain. This must be managed with paramount reference to its health, to which every other consideration should be subservient. This, of course, requires prudence and discretion, a disregard of the more attractive objects of education, and a superiority over the vulgar prejudices so prevalent on this subject. Whatever habits or exercises are calculated to impair the mental health of any child must necessarily favour the growth of morbid tendencies wherever they exist. Errors which may be harmless to such as are happily organized, act with fearful effect upon those who have inherited a proclivity to disease. The most pernicious, and, at the same time, the most common of these errors in our present methods of education, is to require an excessive amount of study. It is curious how few have any other idea of the youthful brain, than that of a machine exempted from the ordinary lot of wear and tear. * * *

"Children are made to study while yet too young. * * * But it is at a later period, when the common repugnance to study is overcome by its glittering rewards, that the danger begins. By one motive or another, the brain is stimulated to an amount of application that would be excessive in adult age. The requirements of teachers, the love of distinction, the thirst for knowledge, blunt the sense of fatigue, and the usual ignorance or carelessness of nature's laws utters no warning against the danger. Six, eight, ten hours a day, in school or out, the mind is engaged in the most exhaustive exercise, and even the night is not entirely given to rest. If anything is calculated to foster unhealthy tendencies, it certainly is such management as this, because it vitiates and weakens those energies on which we must chiefly rely in maintaining the health of the brain against the influence of abnormal tendencies.

"Supposing the individual who has inherited tendencies to mental disease, to have arrived at manhood and entered on the serious business of life, how shall he prevent, if possible, the development of those tendencies into actual disease. * * *

"The necessity of ordering one's life with reference to this constitutional defect being admitted, it must be premised that the same rules of living are not equally applicable to all men. Difference of temperament, of education, of taste, of pursuits, require diversity of management; insomuch that a course of living most salutary to one might be filled with danger to another. * * *

"Most persons have some weak point in their physical constitution, and this, by a well-known law of the animal economy, is the first to suffer under any general disturbance of the vital actions. Whatever habit or indulgence, therefore, may be supposed, under the common rules of hygiene, to impair the vital energies, should be carefully shunned. Good habits of living, abundant exercise in the open air, unstinted sleep, plain, nutritious food, moderation and temperance in all things, beneficial as they are to all, are peculiarly important to those whose hereditary tendencies expose them to mental disease. Especially are stimulants, and whatever else is calculated to affect the nervous system, to be used with extreme caution. I do not say that they are invariably and unconditionally injurious, but that they generally are when used to excess, and often are, even when used with judicious moderation. Nobody, therefore, with the morbid tendencies in question, and sincerely desirous of preventing their development, will hesitate to deny himself all indulgence in tobacco and spirituous liquors, not implicitly required by some other conditions. * * *

"Excessive bodily exertion, by deranging some of the functions of organic life, may thus indirectly occasion mental disease, and therefore should be cautiously used by the class of persons in question. No small amount of insanity in this country, especially among the young married American women of the humbler classes, is produced by a degree of daily toil greatly beyond their power of endurance, and enlivened by insufficient recreation or amusement. * * *

"However important may be the physical regimen of persons predisposed to mental disease, it is, unquestionably, upon their mental exercises that the fate of the larger portion must chiefly depend. How these shall be ordered so as to best secure the object in view—what kind and amount of mental application shall be allowed—what moral and intellectual powers shall be cultivated or neglected—these are questions to be carefully and intelligently considered. * * *

"By the class of persons whose case we are here considering, no more conservative agency can be had than that of suitable and steady employment. * * *

"It should require an amount of application much less than that deemed safe and proper in more happily constituted minds. Here the brain is peculiarly sensitive to any strain upon its energies, and being deprived of its proper elasticity, it fails to recover itself completely when the tension is removed. A degree of irritability, and perhaps of discomfort, is finally established, which may be readily converted into disease. A full amount of mental labour, therefore, is out of the question, and it is the part of wisdom to recognize the fact and conform to its requisitions.

"The employment should be not merely an easy sort of drudgery or busy idleness, but one as interesting and useful as practicable, and adapted to the person's taste and station. Simple occupation of the attention is better than nothing, but it lacks those conservative influences which flow from the consciousness of having accomplished something that needed to be done. It should involve no great responsibility, nor subject one to unpleasant intercourse with others. * * *

"From social pleasures of the simple, quiet kind, the happiest effect may be expected; but absolute seclusion should not be more carefully avoided than gatherings of people where the sound of passion is heard, and the heart and the will are carried away captive by the irresistible power of sympathy. * * *

"Of any employment or recreation, it should be an indispensable condition that it should not curtail the proper allowance of sleep, either by encroaching on its regular hours, or by filling the mind with thoughts and images that refuse to depart at bidding. Deficient sleep is a source of imminent peril, and when it continues for several days, the appropriate remedies should be sought without delay. * * *

"When the morbid tendency begins to show itself, merely in unusual restlessness, there may be a craving for amusements and exciting scenes, which friends are too ready to indulge, with no idea of the danger they incur. Nothing can be more mischievous than such indulgence, calculated, as it is, to cherish the kindling spark and fan it into an uncontrollable flame. * * *

"Persons predisposed to mental disease should carefully avoid a partial, one-sided cultivation of their mental powers—a fault to which their mental consti-

tution renders them peculiarly liable. Let them bear in mind that every prominent trait of character, intellectual or moral, every favourite form of mental exercise is liable to be fostered at the expense of other exercises and attributes, until it becomes an indication of actual disease. Here lies their peculiar danger, that the very thing most agreeable to their taste and feelings, is that which they have most to fear. Many of this class of persons possess a large endowment of the ideal faculty. They delight to dwell in the regions of fancy, and the subjects they habitually contemplate are such as the imagination only can supply. * * * Such persons should beware how they yield to their favourite contemplations. As a matter of safety, they should cultivate those faculties which are concerned with objective or definite truths, such as those of mathematics, natural history, and natural philosophy. These require a more equal and steady attention, and are marked by more exact and tangible results, all well calculated to check that roving movement of the mind, which, under whatever name it may pass, weakens its powers of self-control, and thus invites the approach of disease. * * *

"There is another disposition of mind to be carefully shunned by the class of persons in question—that of allowing the attention to be engrossed by some particular interest to the neglect of every other, even of those most nearly connected with the welfare of the individual. * * * Where the mind of a person revolves in a very narrow circle of thought, it lacks entirely that recuperative and invigorating power which springs from a wider comprehension of things, and more numerous objects of interest. The habit of brooding over a single idea is calculated to dwarf the soundest mind; but to those unfortunately constituted, it is positively dangerous, because they are easily led to this kind of partial mental activity, and are kept from running into fatal extremes by none of those conservative agencies which a broader discipline and a more generous culture naturally furnish. The result of this continual dwelling on a favourite idea is, that it comes up unbidden, and cannot be dismissed at pleasure. Reason, fancy, passion, emotion—every power of the mind, in short—are pressed into its service, until it is magnified into gigantic proportions, and endowed with wonderful attributes. The conceptions become unnaturally vivid, the general views narrow and distorted, the proprieties of time and place are disregarded, the guiding, controlling power of the mind is disturbed, and, as the last stage of this melancholy process, reason is completely dethroned. These persons should be careful, therefore, how they suffer themselves to be led into the active support of those prominent moral and social enterprises that abound in every community. No matter what may be their convictions touching the necessity or justice of these projects, or the claims they make on the sympathy of all good and true men. They cannot join the ranks of those whose devotion to their favourite cause knows no stint or measure, without serious peril to their mental integrity. Let them, therefore, habitually feel that their mission in life lies in the quiet, unobtrusive performance of those duties which are incumbent on all, rather than in the promotion of enterprises which court the public gaze and stimulate their energies to the highest possible pitch. Let them not be beguiled by any fanciful obligations of duty, to quit the humbler sphere of effort most suitable to their mental capacities. There will always be enough to take the prominent places which they had better avoid, while no sphere of life is without its opportunities of useful and honourable effort." * * *

Having thus written of the management of the intellect, the Doctor proceeds to that of the moral or emotional faculties. He believes that, "to some extent at least," persons "have the power of controlling their moral movements, and to that extent of hastening or retarding an attack of disease." Every person having a hereditary tendency to insanity should learn his own ruling sentiments, and, as no one can see himself as others see him, he should have those sentiments pointed out to him by his friends. These sentiments, making obliquities of character, are various.

"In one, it is an inordinate love of money; in another, of fame and glory; in another, of reforming social evils; in another, of projecting great benevolent enterprises; in another, of intense religious excitement. The object pursued may not be intrinsically bad: on the contrary, it may be highly commendable and worthy the attention of a rational being, and consequently the passion or

affection is indulged, until it shapes every movement and passes beyond the control of the intellect. In fact, the more commendable the object, other things being equal, the greater the danger, because entirely unsuspected. The daily experience of life furnishes abundant illustrations of the subject, but my limits forbid the notice of many.

"The sentiment of benevolence, allying us, as it does, to the great Giver of all good, would seem, at first thought, less likely than any other to be the source of an unhealthy activity, and yet when so strong as to be the predominant trait in the moral constitution, it is liable, in the class of persons under consideration, if not carefully watched, to lead to the most painful results. When thus indulged, life, duty, right and wrong, God and man, are often viewed solely by the light of this sentiment, with none of those softening shadows which the rest, under a more equal cultivation, would impart. Justice, discretion, expediency, even right, must all yield to the mere impulses of benevolence, which recognizes no degrees or shades in moral obligation. Oppression under any and every form must be immediately abated by an appeal to force; reforms are to be thrust upon the world, regardless of time and season; abuses are to be torn up by the roots, careless of the healthy growth around that may be injured by the process; and individuals are held to be responsible for any wrong with which they may be ever so remotely connected. Whatever is, is absolutely right or absolutely wrong, to be fondly cherished or summarily destroyed. No palliation of the evil is to be found in the attending circumstances; no remedy is to be tolerated that implies any prospective change in the delinquent. Thus, it becomes, at last, to be regarded as a sacred duty to vindicate the claims of abstract benevolence at whatever hazard, even though it lead through seas of blood and fire. Instances of this moral obliquity are not rare in the world, and so imperfectly is their character understood, that it is an equal chance whether they pass for fanatics, madmen, or hardened criminals. Looking at them in their true psychological relations, we need to have no doubt on this point. Let those, therefore, to whom the warning is peculiarly necessary, who find themselves deeply interested and engaged in promoting benevolent enterprises, reflect that, little as they may suspect it, every day is bearing them beyond the reach of those healthful activities which prevent eccentric movements of the mind from passing over the limits of safety.

"Again, no sentiment of our nature is more generally cultivated, in all Christion communities, than the religious; and, connected as it is with the highest interests of the individual, it is not strange that it should often be excessively exercised, and strained beyond the point of healthy endurance. In persons of ill-balanced minds, this result is almost inevitable, unless prevented by timely precaution and management. The elevated themes which engage their attention are allowed to withdraw the mind from every other apparently inferior object, with the usual result of narrowing the intellectual range, and disturbing that rightful balance of the faculties which always characterizes the most efficient order of minds. Gradually and unconsciously they reach a point where they have no thought for any thing else but their favourite themes. Intense and constant meditation upon them is followed, sooner or later, by its legitimate results—excessive extravagance of thought, unnatural rapidity of the mental movements, startling imagery, irrational combinations of ideas, and downright delusion."

"The danger in this class of cases is all the greater, because the sentiment is pre-eminently social in its character, and its indulgence is greatly affected by the power of sympathy. The example of multitudes engaged in similar exercises, encouraging and emulating one another in the intensity of their feelings, has a mighty influence, even upon the most sluggish spirits, while upon those of morbid proclivities, it often operates with irresistible force, sometimes when least expected, and breaks down every barrier that reason can place in its way. This is not a rare and exceptional phenomenon. In the tables of causes contained in the reports of many of our hospitals for the insane, many cases are always attributed to 'religious excitement.'"

(Two or three cases, from the thousands upon record, are here given.)

"The voice of admonition too often falls on unwilling ears, for people are

slow to believe that exercises which are highly meritorious, because leading to a good result, and prompted, perhaps, by divine influence, can, by any possibility, be dangerous to the mental health. Indeed, it seems to them little short of impiety to suppose it. Let them remember that they are yet in the flesh, and that no pursuit or exercise, however commendable, can be successfully followed by a system of means not in accordance with the laws of the animal economy. They may be sure that these will not be suspended to enable them to accomplish a desirable end; and they may be also sure, that divine influences are always in harmony with those natural laws which have proceeded from the same beneficent source. Those who are sincerely desirous of guarding against the development of morbid tendencies, should carefully avoid all scenes of religious excitement, indulge their religious emotions in quiet and by ordinary methods, always allowing other emotions and other duties their rightful share of attention. Regulated in this manner, the religious sentiment will be to them, not only a source of spiritual comfort, but a power more efficient, it may be than any other, for maintaining the healthy balance of the faculties, and keeping in abeyance the hereditary proclivities to disease."

"If I have said nothing of the danger to be apprehended from the indulgence of other passions—envy, anger, jealousy, pride, fear or grief—it certainly is not because such indulgence is harmless to the health of the mind, even in those most fortunately constituted. In the ordinary intercourse of life, we not unfrequently meet with persons who, with all the force of an instinct, view whatever passes around them with a jealous eye—ever ready to find, in the sayings and doings of others, evidence of hostility or unfriendliness to them, and to see, in the most trivial occurrences, matured designs of annoyance. They are constantly breaking with their best friends, and spend their whole life in converting the innocent occasions of private and public intercourse into pretexts for coldness and disaffection. In others, again, the ruling passion is envy. Their blessings, whether small or great, are of little satisfaction, because others are enjoying what seem to them greater. Favors bestowed on others are regarded as proofs of the most culpable neglect of their superior deserts. They feel as if every one who has any reason to rejoice in the good things of life, is guilty of a positive wrong towards them, and bound to make restitution and recompense. Persons of this description—inheriting tendencies to disease and ruled by some predominant passion—are never far removed from the brink of insanity, over which they are liable to be precipitated by the first adverse incident that severely tries their power of endurance. Early judicious discipline might have repressed the growth of the passion, and, to that extent, have secured the future integrity of the mind."

2. Although the *New Jersey State Lunatic Asylum* is among a people who were somewhat cautious and tardy in the recognition of its excellence, its officers may now be well satisfied with the appreciation of its merits. In the language of the report—"the house has been much crowded through the entire year, notwithstanding the removal of a pretty large number—seventy-four—of chronic cases.

"Many of these, though regarded as incurable, were still proper subjects for care and treatment in the asylum, and were only removed by the public authorities, or by friends, upon the urgent request of the officers of the institution, to make room for other and more necessitous cases."

	Men.	Women.	Total.
Patients in the asylum, December 31, 1859	141	165	306
Admitted in the course of the year	85	89	174
Whole number	226	254	480
Discharged, including deaths	72	98	170
Remaining, December 31, 1860	154	156	310
Of those discharged, there were cured	28	45	73
Died	15	8	23
Whole number of cases from May 15, 1848	830	907	1737
Recovered	320	358	678
Died	123	106	229

Deaths in 1860.—From consumption, 2; epilepsy, 3; exhaustion of acute mania, 9; apoplexy, 1; softening of brain, 1; exhaustion of chronic mania, 4; dropsy, 2; "uncertain," 1.

In two cases of fatality from the exhaustion of acute mania death occurred within a few hours after the patients arrived at the hospital. Dr. Buttolph very properly remarks, that "it is often an important question to decide whether a patient in an acute attack, who has been several days and nights without regular food and rest, and who has made much exhausting effort, may not be too much prostrated in strength to bear a fatiguing journey from home to the asylum. The removal should at least be advised by the medical attendant in charge, who should point out such precautionary measures in accomplishing it as will tend to relieve the patient, as far as possible, of exhausting effects."

In view of the crowded state of the hospital, and the numerous applicants for its benefits, Dr. Buttolph, after asserting that additional accommodations for the insane of the State are urgently demanded, discusses the question whether those accommodations shall be obtained by the enlargement of the present hospital, or by the erection of another. He concludes that, notwithstanding the present number of patients in his establishment is upwards of 300, "the number may be somewhat increased without materially increasing the difficulty of its oversight." He mentions the numerous advantages of the location, and proposes, "if the policy of enlarging the present structure be adopted, to provide rooms for one hundred more patients."

Three hundred and ten (the present number), plus *one hundred*, equals *four hundred and ten*. How happens it that "in the abstract," "theoretically," "as a general rule," the members of the Association of Medical Superintendents assert that *two hundred and fifty* is the utmost proper limit to the number of patients in a hospital, and yet, whenever the principle is to be adopted or rejected in any one of their individual cases, they "go in" for the enlargement *ad libitum* of their already overgrown establishments. "Logic is logic," but theory is not always practice.

3. The report before us of the *Western Lunatic Asylum of Virginia* embraces a period of fourteen months, ending with the 30th of November, 1860; and, although Dr. Stribling is not remarkable for prolixity, he has, in this instance, been unwontedly brief.

	Men.	Women.	Total.
Patients, October 1, 1859	219	153	372
Admitted in course of fourteen months	31	24	55
Whole number	250	177	427
Discharged, including deaths	28	20	48
Remaining, November 30, 1860	222	157	379
Of those discharged, there were cured	18	10	28
Died	9	8	17

It appears that a very large proportion of the patients in this hospital are incurable, and as no provision has here been made for the removal of harmless cases of this class, either to their homes or to other receptacles, the number of admissions is small for so large an institution. Of 250 applicants in the course of fourteen months, only 53 were received. These, as was supposed, were such as were the most curable, and were selected, in the exercise of a discriminative power, by the Superintendent. The exercise of the power mentioned often, as may readily be conceived, gives offence, and Dr. Stribling suggests that a law be enacted for the removal of old demented cases to the county almshouses, thus opening the way to a more general admission of new applicants.

A third hospital for the insane within the State is thus mentioned in the report: "I am not apprised as to when it is expected, by those in charge, to have accommodations for the insane at Western Virginia. If the *entire* building being erected must be completed before patients are admitted we can but fear the day is somewhat remote when these sufferers will find an asylum there."

4. The report for 1860, of Dr. Parker, of the *State Lunatic Asylum of South Carolina*, is brief, and presents but few points of other than local interest.

Patients at the beginning of the year	194
Admitted in course of the year	69
Whole number	263
Discharged, including deaths	71
Remaining at the end of the year	192
Of those discharged, there were cured	37
Died	26

Of the 192 remaining at the end of the year, 86 were males and 106 females. The predominance of females is attributed to the rejection of many male applicants, for the want of proper accommodations. An additional section to the new building is in progress.

"There has been an unusual number of applications for the admission of male slaves. The removal of all males from the old buildings and grounds made it necessary to remove the coloured patients of that sex, since which time we have had no place for that class. In consequence, many persons in the country are embarrassed with insane servants, and earnestly beg that influence be exerted with the legislature for some provision to be made which will relieve them from the responsibility and danger of keeping such patients at home, without the proper means of their comfort and cure. Insane coloured women we continue to receive, and have been fortunate in sending several to their homes, ready and competent to discharge their usual duties.

"Since the occupancy of the old building exclusively by females, it has undergone repairs and is improved in many respects, especially in the general arrangement and classification of the patients, all of which is very perceptible, and has been productive of uniform contentment among them.

"To Miss D. L. Dix we are largely indebted for her prompt response to an invitation extended by the Regents. At their call she visited our Asylum, with peculiar interest in behalf of its inmates, though herself in feeble health, spent her time at the capital, and with indomitable zeal and perseverance, discreetly and modestly exercised, successfully brought to the notice of every member of our Legislature the claims of our insane."

5. The subjoined statistics are taken from the report of the *Northern Ohio Lunatic Asylum*, for the fiscal year ending October 31, 1860:—

	Men.	Women.	Total.
Patients at the beginning of the year	66	72	138
Admitted in the course of the year	52	63	115
Whole number	118	135	253
Discharged, including deaths	54	64	118
Remaining at the end of the year	64	71	135
Of the discharged, there were cured	23	31	54
Died		2	2

Died from "exhaustion," 1; congestion of the brain, 1.

"The health of the inmates," says Dr. Kendrick, "has been uniformly good during the year. The physical disorders incident to hospital life have been mild in form and readily controlled by ordinary hygienic precautions and simple remedies. A procrustean plan of treatment is as little applicable to the insane as to the sane. We do not think of adapting the patient to the remedy in physical disease; so in mental disorder, which is but a manifestation of a diseased brain, we must modify our treatment to suit the varying wants of each case.

"The nearer the approach to *individualized* treatment in our hospitals—other things being equal—the greater the success. The percentage of recoveries will be increased in direct ratio with the increase of resources; proper classification, appropriate labour, constant mental employment, so diversified as not to weary, are indispensable to a successful treatment of the insane. They may as well be confined in the infirmaries and jails of their counties as in our public

hospitals, if debarred, by narrow minded views of economy, from that extensive range of employment and amusement now so universally furnished the insane in curative institutions. I am sorry to say that our institution is behind the age in these respects. Great changes must take place to bring it up to that high standard of excellence, to which a worthy ambition prompts us to aspire."

6. The general results of treatment at the *Hamilton County* (*Ohio*) *Lunatic Asylum*, for the year ending June 5, 1859, were as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year	112	118	230
Admitted in the course of the year	105	59	164
Whole number	217	177	394
Discharged, including deaths	74	47	121
Remaining at the end of the year	143	130	273
Of the discharged, there were cured	43	19	62
Died	5	12	17

Died from maniacal exhaustion, 3; nephritis, 2; epilepsy, 2; marasmus, 2; chronic dysentery, 2; purpura, 1; paralysis, 1; gastritis, 1; phthisis, 1; delirium tremens, 1; suicide, 1.

"As heretofore, and as must always necessarily be the case under conditions similar to those affecting us, the diseases attacking our inmates, no matter what may have been their type primarily, speedily assume an asthenic character, requiring the most prompt, efficient and persistent stimulating plan of treatment to successfully combat them."

Of the 394 patients, 289 were foreigners and 105 natives of the United States.

"From changes of scene, of climate, and mode of life, separation from friends, regrets and yearnings for home, annoyances and misfortunes suffered and diseases contracted on ship passage, disappointed prospects, blighted hopes, poverty, ill health, and the too general prevalence of intemperance—that fruitful source of insanity among them—many a poor emigrant is driven to madness who would never have been bereft of reason had he lived and died in his native land."

It will perhaps be remembered, that the buildings of the Hamilton County Asylum were intended only for temporary use. At the time of the publication of the report before us, the new buildings specially erected for the institution were far advanced toward completion.

7. The report for 1858 of the *Insane Asylum of California*, extends over a period of but eleven months, the official year being made to close with the close of the month of November.

	Men.	Women.	Total.
Patients in asylum Jan. 1st	156	32	188
Admitted	201	43	244
Whole number	357	75	432
Discharged, including deaths	133	26	159
Remaining Nov. 30th	224	49	273
Of the discharged, there were cured	88	24	112
Died	30	2	32

The diseases terminating fatally are not reported.

"In California," says Dr. Aylett, "the sick have few friends, and are therefore quickly dispatched to the hospital. In this way the heartless stranger proves, really, the best friend of the poor lunatic." The very large proportion of cures at this hospital, as shown by the foregoing statistics, is undoubtedly, as intimated in the report, to be attributed to the fact that the patients are placed under hospital treatment at a very early period of the disease. We here have a practical argument in favour of early treatment which should be neither overlooked nor forgotten.

Dr. Aylett's report is brief, and mostly confined to the financial department of the hospital. We infer from it that an economy so rigid is required that there

is an impossibility of furnishing those abundant facilities for moral treatment which are found at some other institutions. "For a few months," says he, "we had the use of a billiard-table, for which we were indebted to the kindness of Mr. Butler, the architect of the late improvements. I was surprised to find how much interest was taken in the game by some of the patients, who were thus beguiled of many a tedious and melancholy hour."

But the following extracts have a pleasant look: "I do not hesitate to say that the improvements effected by the labours of the patients in the last twelve months would have cost, at the usual rate of labour, at least fifteen thousand dollars. * * * After the month of May, I hope and expect to dispense with a vegetable bill altogether. We have one thousand thrifty trees, of all varieties of fruit, from which we may expect a most abundant crop in a couple of years. We ought to set out about three thousand grape-vines this winter, and for this purpose, and for the purchase of tools, seeds, etc., we need an appropriation of five thousand dollars."

8. The *Wisconsin State Hospital for the Insane* was begun several years ago, but its progress toward completion was checked by many obstacles, both financial and political. The officers first elected having been removed, others were appointed to their places, and, after many vicissitudes, the central building and one wing of the hospital were prepared for the reception of patients. The establishment was opened on the 14th of July, 1860, under the care of Dr. John P. Clement, who had previously been connected, as Assistant Physician, with the Hospital at Brattleboro', Vermont. The Trustees, in their report, present to the Governor, and through him to the people of the State, the following consolatory and congratulatory words:—

"As some relief to the disappointment and vexation which this institution has hitherto created upon the public mind, we are now able to present the consoling intelligence that when the balance of indebtedness above set forth ($50,000) shall have been paid, the committee believe that no remaining debt will exist against the institution from any source whatever. It argues much, in behalf of the generosity of the people of Wisconsin that in the midst of unparalleled pecuniary embarrassments, they have contributed directly and so largely, from their scanty means, to procure the erection of this much needed institution, for the relief of that unfortunate class of their fellow-citizens who have been deprived of their reasoning faculties. But they have at length the cheering consolation, that through much struggling and adversity, they have patiently persevered in behalf of such as are deprived of those noble attributes which constitute the manhood of man, till they have succeeded in establishing a proud and enduring monument to their humane instincts, and sympathizing benevolence. And, though the struggle has been long and arduous, we are happy to believe, that with a little more skirmishing, the victory will be completely and nobly won."

The report is dated December 16th, a little more than five months after the hospital was opened.

	Men.	Women.	Total.
Patients received to that time	43	46	89
Discharged, including deaths	3	8	11
Remaining	40	38	78
Of the discharged, there were cured			3
Died			3

Died from exhaustion in puerperal mania, 1; phthisis, 1; softening of the brain, 1.

"Of those remaining, four at least have recovered and will soon be discharged, making the recoveries seven in all. There are, perhaps, ten others whose recovery may be reasonably expected. A few others will probably be sufficiently improved to render their return home advisable.

"The large number of remaining cases are incurable, and incapable of any material improvement. Still, their condition is ameliorated by care and treatment in an institution specially designed for them. The violent are managed

with much less restraint and coercion than would be necessary at their homes, or in jails and poor-houses. The filthy are often rendered more cleanly, and the noisy more quiet and orderly. The homicidal often become harmless. Two patients are now quietly walking our wards, whom it was thought necessary to chain, for a long time, at their homes."

Dr. Clement alludes to the evils arising from the attempt to treat both sexes in one wing of the building, as well as from the gathering of nearly a hundred patients into apartments designed for but about thirty, and appears anxious to have another section of the edifice erected. P. E.

ART. XVII.—*Lectures on the Diagnosis and Treatment of the Principal Forms of Paralysis of the Lower Extremities.* By E. BROWN-SÉQUARD, M. D., F. R. S., Fellow of the Royal College of Physicians of London, Hon. Fellow of the Faculty of Physicians and Surgeons of Glasgow, Laureate of the Institute of France (Academy of Sciences), etc. etc. 8vo. pp. 118. J. B. Lippincott & Co.: Philadelphia, 1861.

THE substance of this excellent work originally formed part of a course of lectures on various subjects delivered by Dr. Séquard, in April and May, 1859, to classes of physicians and students in the Universities of Edinburgh and Glasgow, and in Dublin. Its leading object is to point out the extreme importance of a clear diagnosis of the various forms of paralysis of the lower limbs, and especially of the two most frequent and distinct varieties, viz.: reflex paraplegia and paralysis due to myelitis.

In the treatment of paraplegia it is well known that strychnia, brucia, phosphorus, sulphur, mercury, ergot, belladonna, and cantharides, have been employed, sometimes with marked benefit and sometimes with injury to the patient. These drugs differ very considerably in their action upon the spinal cord. Some of them, as strychnia and brucia, increase the quantity of blood in the vessels of the medulla, while others, as mercury, ergot, and belladonna, diminish it. It is very evident, therefore, that if we do not carefully discriminate between the different kinds of paraplegia we must often commit serious errors in the treatment of this disease. For all the cases of paraplegia are divisible into two general groups: one in which there is an excessive quantity of blood circulating in the spinal cord; the other, in which the amount of this fluid is too small. Now the whole history of reflex paraplegia shows that it is accompanied, and most likely produced, by an insufficiency of blood in the cord. Remedies tending to diminish the quantity of this fluid still more should, therefore, be avoided. Nevertheless, mercury is often and very unwisely employed in the treatment of just such cases. On the other hand, cases of myelitis, in which the opposite condition exists, are often treated with strychnia, the very remedy which so decidedly increases the amount of blood in the cord.

In his second lecture our author places the practical physician under great obligation by carefully detailing the striking differences which exist between the symptoms of reflex paraplegia and those of the various forms of paraplegia of centric origin. In the following table which we borrow from his pages, and which is based upon numerous cases observed by Stanley, Rayer, Leroy d'Etiolles, Jr., Landry, Macario, Spencer Wells, Séquard himself, and others, are condensed the principal features of two of the most characteristic varieties of reflex and centric paralysis of the lower extremities—the paraplegia due to a reflex influence originating in the urinary organs and the paraplegia produced by myelitis:—

URINARY PARAPLEGIA.	PARAPLEGIA FROM MYELITIS.
1. Preceded by an affection of the bladder, the kidneys, or the prostate.	1. Usually no disease of the urinary organs except as a consequence of the paralysis.
2. Usually lower limbs alone paralyzed.	2. Usually other parts paralyzed besides the lower limbs.

URINARY PARAPLEGIA.	PARAPLEGIA FROM MYELITIS.
3. No gradual extension of the paralysis upwards.	3. Most frequently a gradual extension of the paralysis upwards.
4. Usually paralysis incomplete.	4. Very frequently paralysis complete.
5. Some muscles more paralyzed than others.	5. The degree of paralysis is the same in the various muscles of the lower limbs.
6. Reflex power neither much increased nor completely lost.	6. Reflex power often lost, or sometimes much increased.
7. Bladder and rectum rarely paralyzed, or, at least, only slightly paralyzed.	7. Bladder and rectum usually paralyzed, completely or nearly so.
8. Spasms in paralyzed muscles extremely rare.	8. Always spasms, or, at least, twitchings.
9. Very rarely pains in the spine, either spontaneously or caused by pressure, percussion, warm water, ice, &c.	9. Always some degree of pain existing spontaneously, or caused by external excitations.
10. No feeling of pain or constriction round the abdomen or the chest.	10. Usually a feeling as if a cord were tied tightly round the boundary at the upper limit of the paralysis.
11. No formication, no pricking, no disagreeable sensation of cold or heat.	11. Always formications, or pricking, or both, and very often sensations of heat or cold.
12. Anæsthesia rare.	12. Anæsthesia very frequent, and always, at least, numbness.
13. Usually obstinate gastric derangement.	13. Gastric digestion good, unless the myelitis has extended high up in the cord.
14. Great changes in the degree of the paralysis corresponding to changes in the disease of the urinary organs.	14. Ameliorations very rare, and not following changes in the condition of the urinary organs.
15. Cure frequently and rapidly obtained, or taking place spontaneously after a notable amelioration or the cure of the urinary affection.	15. Frequently a slow and gradual progress towards a fatal issue; very rarely a complete cure.

In cases of myelitis the urine is almost always alkaline: while in cases of reflex paraplegia, not depending upon a disease of the urinary organs, it is usually acid, as in health. Paraplegia depending upon spinal meningitis may be distinguished from reflex paraplegia by a rigid spasm of the muscles of the back by the intense pain caused by motion of the lower limbs or of the spine, or by the spontaneous acute pains that radiate from the spine to the lower extremities, and the frequency of cramps. When paraplegia is produced by the pressure of a tumour, a diseased bone, or fibro-cartilage upon the spinal cord, there is usually a feeling of tightness, or pseudo-neuralgic pain, or a degree of formication, only in the parts of the body receiving their nerves from that part of the cord which is pressed upon, unless there is a myelitis or a meningitis, in which case these symptoms may exist in all parts of the body below the seat of pressure. At this point there is also pain or tenderness. In cases of paralysis of the lower limbs produced by a tumour in the gray matter of the spinal cord anæsthesia appears at the onset of the affection, and may be more marked than the loss of motor power. Reflex power in the parts of the cord below the tumour becomes extremely exalted, so that very slight excitations will produce the most violent reflex movements. The only great differential characteristic of hysterical paraplegia is, that the paraplegia has followed hysteria. Our author thinks it probable that in most cases, if not in all, hysterical paralysis is but a reflex paralysis. Paraplegia caused by hemorrhage in the spinal canal is characterized by the existence of a vague pain along the spine some time before the paralysis appears by the suddenness of its appearance, and by the very frequent occurrence of violent convulsions, or, at least, of spasmodic twitchings. When blood is effused into the gray matter of the spinal cord the resulting paraplegia appears suddenly and is always accompanied by a notable diminution of sensibility. In paraplegia produced by congestion of the spinal cord and its membranes, the patient, on rising after a night's rest, is much more paralyzed than when he has been moving about, or has remained in a sitting posture for some time. The reverse of this is usually observed in reflex paralysis. Paraplegia is sometimes caused by non-inflammatory softening of the cord, and may be distinguished from reflex paralysis by the absence of any external cause of spinal irritation,

by the very slow development of the paralysis, and sometimes by the arcus senilis, and the presence of a calcareous deposit in superficial bloodvessels of the head or limbs, &c. Paraplegia due to an obstacle in the circulation of blood in the aorta, or in its principal ramifications in the pelvis, may be recognized by the alternations of nutrition and pains in the paralyzed limbs, and especially by the rapid increase of the paralysis after every notable exertion of the lower limbs, and the return of some power after rest. Paraplegia resulting from pressure on the pelvic nerves is accompanied by violent pains in the pelvis and in many parts of the lower limbs by the production of cramps, &c.

Our author denies the existence of cases of the so-called essential or idiopathic paraplegia, and maintains that other forms of this disease, such as those which are connected with gout, rheumatism, or those which follow grave fevers, cholera, &c., either depend upon venous congestion of the cord, and serous effusion into the spinal canal, or belong to the group of reflex paralyses. Paraplegia is sometimes a result of poisoning by carbonic acid, lead, arsenic, mercury, opium, belladonna, tobacco, camphor, mushrooms, fish, &c. Great loss of blood, concussion, fracture, or luxation of the spine, also produce this disease. In all such cases the diagnosis is rendered easy by a knowledge of the cause.

In treating a case of reflex paraplegia our remedies must first be directed against the external cause of the affection, and, secondly, against the paralysis itself. The nephritis, cystitis, pneumonia, enteritis, or other morbid condition which may be the cause of the paralysis, must be carefully treated. In the next place we should endeavour to prevent or to diminish the transmission of any nervous influence from the diseased nerve or organ to the spinal cord. For this purpose we must try, by the use of narcotics and anodynes, to paralyze for a time the sensitive nerves engaged in conveying the morbid influence. To diminish pain or to prevent reflex action, no narcotic is more powerful than belladonna locally employed.

"In cases of disease of the urethra or the prostate, an injection of a solution of one grain of the extract of belladonna, in twenty drops of laudanum, is to be made into the urethra, and the injection should be retained half an hour, or even an hour, after which some emollient decoction should be employed to wash away the rest of the narcotics. Every two or three days the same operation should be repeated. In the intervening days, I advise the use of an injection of thirty drops of laudanum without belladonna. In cases of a disease of the bladder, I recommend the use of an injection into the bladder of a solution of one grain of the extract of belladonna, in twenty drops of laudanum, just after a complete emission of urine. One day this injection is employed, and the next day twenty-five or thirty drops of laudanum alone are injected. When the prostate is very much enlarged, a suppository, covered with a belladonna-and-opium ointment, ought to be put at times in the rectum.

"When the irritation that causes a reflex paraplegia starts from the vagina or the uterus, a pill of half a grain of extract of belladonna with one grain of extract of opium, surrounded by a piece of cotton wool, is introduced far into the vagina, and even up to the neck of the uterus. By means of a thread attached to the cotton, it is withdrawn as soon as the pain has ceased or much diminished. This simple means I have seen often employed with benefit by my learned teacher, Professor Trousseau, in painful affections of the womb, and I have myself made use of it with great advantage in two cases of reflex paraplegia, and in several cases of hysterical paralysis.

"In cases of a reflex paraplegia due to dysentery, colitis, or other morbid irritations of the large intestine, accompanied by diarrhœa, opium alone—*i. e.*, without belladonna—should be employed in enemata. In cases of paraplegia due to teething, if it coexists with enteritis, as it often does, opium is the narcotic to be employed, and it should then be taken by the mouth in very small but repeated doses. In cases of neuralgia producing a paraplegia, the narcotic that should be chiefly employed to relieve pain is opium, and so also in cases of paraplegia due to a disease of the stomach, the liver, the kidneys, the pleuræ; but even in all these cases, belladonna may be used with profit if united with opium, if it is not often employed, and especially if strychnine is also used at the same time. I could not insist enough upon the importance of the necessity of

never using belladonna without employing, at the same time, strychnine and opium, or, at least, strychnine, in cases of reflex paraplegia. I must repeat, also, that in this affection, when belladonna is employed, its use ought not to be a constant one; and, if the patients are not very costive, opium ought always to be the principal narcotic used to alleviate the external irritation that causes the paralysis."

The great object of this narcotic treatment is to bring about dilatation of the bloodvessels of the spinal cord, and a consequent increase in the amount of blood circulating in these vessels.

Excitants or revulsives applied to the skin of the legs, as recommended and successfully practised by Graves, the application of cold to the spine, and the employment of galvanism are all very useful in the treatment of many cases of reflex paraplegia. Their mode of action probably consists, according to our author, in producing for a short time the same effect as the irritation, which is the cause of the paralysis—*i. e.*, a contraction of the bloodvessels of the spinal cord; but, according to a well-established law, if such a contraction becomes considerable, the muscular fibres are soon exhausted, and a relaxation of the contracted fibres takes place, and, as a consequence of this relaxation, a dilatation of the bloodvessels occurs.

"To those patients who can bear the application of very cold water to the spine," says Dr. Brown-Séquard, "I prescribe the use of a douche thrown with great force all along the dorsal and lumbar regions of the spine. The douche should be applied for one minute or a minute and a half; it ought to be supplied with a small jet, and the temperature of the water should be between 40° and 50° Fahr. I need hardly say that the spine must be rubbed hard with a warm flannel immediately after the application of the douche. In patients who cannot bear the cold douche, a very warm douche should be made use of. I sometimes make use of alternate applications of cold and heat, either with sponges—one soaked with ice-water, and another with water at 100° Fahr.—or a towel folded somewhat like a cravat, the two ends of which are wet, one with ice-water, the other with warm water, the spine being struck with either end of this towel alternately."

In order to increase still further the quantity of blood in the spinal cord, Dr. Brown-Séquard gives the following directions concerning the position of the patient in bed.

"Every night, and often in the course of the day, the patient should lie down on his back, placing his head, his arms, and his legs, on high pillows, so as to produce by gravitation a congestion in the spinal cord. This simple means, which is also applicable in cases of hysterical paraplegia, and in almost all the cases in which there is an insufficient amount of blood in the spinal cord, is just the reverse of what should be done in cases of inflammation or congestion of the spinal cord or its membranes, or of disease of the spine, &c., in which cases the patient ought to lie flat on the abdomen, or on one side of the body, and have his feet and hands on a much lower level than that of the spine."

The remedies most useful in cases of reflex paraplegia are essentially those which increase the amount of blood in the spinal cord, and augment the vital properties of this nervous centre. Remedies which render the blood richer in nutritive principles are also requisite. Of all known agents strychnia most powerfully increases the vascularity, and, consequently, the nutrition of the cord. The researches of Bonnefin have shown that morphia, nicotine, picrotoxine, cyanuret of mercury, sulphuret of carbon, chloride of barium, oxalic acid, &c., seem to act like strychnia upon the medulla spinalis. Compared with the latter remedy, however, they are deserving of but little confidence in the treatment of reflex paraplegia. In this disease, as we have already seen, the amount of blood in the cord, and the reflex faculty of this organ, are both diminished. As strychnia counteracts both these conditions—or, in other words, increases most decidedly the quantity of blood, and the reflex power of the cord—it becomes, in the hands of the discriminating physician, a powerfully curative agent. When used alone, one-twentieth of a grain should be given in the course of a day. When employed in conjunction with opium, the dose should be reduced to from one-fortieth to one-thirtieth of a grain per day. When given in

combination with belladonna, the dose must be larger, on account of the antagonistic action of belladonna on the spinal cord. Dr. Brown-Séquard also recommends sulphuret of potash baths, made in the proportion of four or five ounces of the salt to sufficient water for a bath.

In his third lecture, our author dwells at length upon the diagnosis and treatment of paraplegia due to myelitis, meningitis, and simple congestion of the cord. The fourth and last lecture is devoted to a consideration of the symptoms and treatment of the various forms of paraplegia produced by white, or non-inflammatory softening of the cord, by hemorrhage into the substance of the medulla or into the vertebral canal, and by tumours pressing upon the cord. Both these lectures abound in such valuable information and suggestions relative to the nature and treatment of paralysis of the lower extremities, that we cannot too strongly urge a careful perusal of them upon those of our readers who may be called upon to treat cases of this troublesome and distressing affection. The work, as a whole, is free from mere theoretical discussion, and is remarkable for the clear and concise manner in which the facts of physiological and clinical observation are combined in the attempt to establish a scientific and successful method of treating the important disease under consideration. J. A. M.

ART. XVIII.—*Surgical Tracts.*

1. *Amputation of the Cervix Uteri.* By J. MARION SIMS, M. D. Extracted from the Transactions of the State of New York, 1861. New York, 1861. 8vo. pp. 16.
2. *Extension and Counter-extension in the Treatment of Fractures of the Long Bones; with a Description of an Apparatus especially designed for Compound Fractures.* By JOSEPH H. VEDDER, A. M., M. D. New York, 1862. 8vo. pp. 23.
3. *A Description of the newly-invented Elastic Tourniquet, for the Use of Armies and Employment in Civil Life, its Uses and Applications, with Remarks on the Different Methods of Arresting Hemorrhage from Gunshot and other Wounds.* New York. 1862. 8vo. pp. 31.
4. *On Intestinal Obstruction by the Solitary Band.* Being a paper read at a meeting of the Medical Society of London, March 25th, 1861, and reprinted from their Transactions. By JOHN GAY, F. R. C. S., &c. London, 1861. Printed for private circulation. 8vo. pp. 16.

1. Dr. SIMS records in this paper nine cases in which amputation of the cervix uteri was performed by a method more simple and safer than the one usually adopted. The cervix is split laterally, and the anterior and posterior halves are removed by means of scissors. After the hemorrhage has ceased, the vaginal mucous membrane is drawn over the stump and secured by four sutures, two on each side of the cervical opening. According to this plan there is no suppuration, the parts healing by the first intention, and the parts becoming well in a week. In the old method of amputation, the suppuration continued five or six weeks, sometimes longer, before the parts entirely cicatrized.

This paper is illustrated by four wood-cuts.

2. The pamphlet of Dr. VEDDER, though the title would lead one to look for something more, contains simply the description of some mechanical contrivances for making extension and counter-extension in the treatment of fractures.

The mode of making extension contrived by Dr. Vedder is that of having on the outside of the splint a ratchet pulley, into which is fastened a strong catgut cord or linen twine that runs over the extremity of the splint to be attached by various means to the broken limb. The ratchet, which is revolved by means of a thumb-plate or lever, is secured at any desired point by a spring catch.

The apparatus of Dr. Vedder, as we learn by the report of the board of army surgeons appointed to investigate its merits—which report is attached to this

pamphlet—was recommended to be furnished to each hospital in Washington and Alexandria, for the purpose of fully testing its value.

This pamphlet contains also a description of an admirable extemporaneous splint, which has already been proved by experience to be of great service in enabling wounded men to be transported with comparative comfort. We will give an account of it by transcribing the description as given by Dr. Foster Swift, surgeon 8th N. Y. State militia:—

"After the battle of Bull Run, on the 21st of July last, we were left with four or five cases of fractured arms, with no appliances for their treatment, and with the prospect of their transportation over a rough road in rough wagons to Manassas, and thence to Richmond. Without splints, and without any light material to make them of, I am indebted to Dr. Hoges, of one of the Mississippi regiments in the rebel army, for the following simple contrivance, which afforded great relief to our wounded men in their jolting journey. Two strips of adhesive plaster were cut two feet in length and three inches in width, one of which was carried over the upper fragment to the point of fracture, leaving the loop above; the other was carried in a similar manner over the lower fragment, forming a loop below. A piece of board about one foot longer than the fractured limb, with a V-shaped piece removed from each end, was then applied to the arm. The lower loop was tied by a bandage to the lower V, and the upper loop to the upper V. The fragments were thus separated, and the limb could be secured to the splint by a simple turn of the bandage, above and below the point of fracture, thus leaving the orifice of the entrance and exit of the ball open."

In place of the board, the surgeon may use two straight branches of a tree, of suitable size and length, having a fork at one end, over which the bandage attached to the loops may be tied. If one branch be let into the other by a notch before they are bound together, the splint will be firm enough to bear any pressure.

3. The newly-invented elastic tourniquet, described in the anonymous publication, placed on the list with the preceding, is the invention of Dr. T. S. Lambert, of New York.

It certainly is an instrument possessing peculiar advantages, inasmuch as it only interrupts the flow of blood through the principal arteries of the limb.

The object of this publication is evidently to set forth the advantages of the employment of this form of tourniquet in military surgery; and the testimonials attached declare that "every officer in our army, from the lowest grade to a general, should have one, and at his leisure moments teach the men of their regiments how they are to be applied," and that "one should be furnished to every soldier in the field." These testimonials, it is scarcely necessary to add, are from civil practitioners. We do not believe ourselves that if every general and other officer of the United States army would devote all his leisure time to teaching how the tourniquet should be applied, and if every soldier in the field would stop his work to put one on so soon as he felt himself struck, that the mortality would be appreciably, if at all, diminished, and the disadvantages attending such proceedings are flagrant.

4. The design of the paper of Mr. Gay on "Intestinal Obstruction by the Solitary Band" is to aid in the diagnosis, and, consequently, in the treatment of cases of internal obstruction. Such cases are more frequent than is generally supposed, for, in the Reports of the Registrar-General for 1855, 420 males and 435 females are said to have died of "obstruction of the bowels," independently of deaths from the various forms of hernia. It often happens, on the post-mortem examination of such cases, that a state of parts is found which might have been relieved during life by the intervention of the surgeon; and one of the most frequent is the presence of a band, forming by its terminal attachments a ring into which a portion of intestine has glided and there become strangulated. From the antecedent history, the mode of attack, and the sensational, the physical, and the functional indications, Mr. Gay believes that a reasonable conclusion may be arrived at in regard to the presence of a band as

the cause of the obstruction. The evidences upon which he lays most stress are:—

1. An antecedent abdominal affection of such severity as to lead the surgeon to believe that it might have been attended with some ulcerative or perforative process of either the bowel or the mesentery. For the repair of these intestinal injuries, lymph is poured out, and afterwards becomes stretched into a band, which may be even twenty inches in length.

2. Suddenness of the attack, without previous visible deterioration of the patient's health.

3. Pain, first localized, then tenderness over a large area.

4. Distension, with general dulness at first, and subsequent concentration of dulness and tension towards the original seat of pain.

5. Vomiting, especially if it speedily becomes fecal.

Mr. Gay believes that no such conjunction of symptoms as these can arise without some sudden alteration in the relation of parts within the abdominal cavity; and that in most cases a bridle will be found to be either directly or indirectly constricting a portion of intestine. So soon as fecal vomiting has set in, the surgeon is, in his opinion, justified in proceeding to explore the abdomen.

Mr. Gay's paper, of which we have given this slight sketch, is a very imperfect one, and we regret to see its publication, inasmuch as it is an evidence of a lack of proper information upon this interesting subject of internal strangulation of the bowels. While the account given of the pathology and of the symptoms of this affection are altogether too meagre, nothing whatever is said as to our means of recognizing the portion of intestine that may be the seat of obstruction, nor as to the diagnosis of accompanying peritonitis, the existence of which must exert great influence upon the determination of the surgeon. In the treatment we are only told that it is justifiable to explore the abdomen, or to open that cavity, and search for the strangulating band, and divide it, if any be found. No mention is made of the formation of an artificial anus, which has often been practised with success in these cases, and which is an operation applicable to all cases of intestinal obstruction.

W. F. A.

ART. XIX.—*Handbook of Surgical Operations.* By STEPHEN SMITH, M.D., Surgeon to Bellevue Hospital. New York: Bailliere Brothers, 1862. 12mo. pp. 279.

THIS volume is designed especially for the use of military surgeons, and is therefore exclusively devoted to the consideration of those branches of operative surgery which are of most importance in the surgery of war.

It is divided into six chapters, entitled respectively "*minor surgery,*" "*on the arteries,*" "*on the veins,*" "*on amputations,*" "*on resections,*" and "*on gun-shot wounds.*"

The second, third, fourth, and fifth chapters, which constitute the great part of the work, contain an admirable exposition of the subjects to the consideration of which they are devoted, and they may be consulted by every surgeon with pleasure and profit.

The chapter on resections is particularly valuable, and it may confidently be said to contain the best account of this important class of surgical operations that is to be found in the English language.

The first chapter on minor surgery cannot be regarded as sufficiently full and complete to fulfil the purpose for which it is designed; and the last chapter contains nothing novel, being mainly an abstract of the able article by Prof. Longmore in "Holmes' Surgery," and with which our readers are already acquainted.

The book is published in a very convenient and portable form, and the text is abundantly illustrated by engravings judiciously selected from the most approved works on operative surgery.

W. F. A.

ART. XX.—*Transactions of the Obstetrical Society of London.* Vol. III. 8vo. pp. 480. London, 1862.

THE present volume, which comprises the Transactions of the society for the year 1861, does not in the slightest degree fall behind the two preceding ones either in the interest or value of its contents. Besides the President's Annual Address, it contains thirty-nine papers—chiefly reports of cases, or practical remarks on questions of importance in reference to obstetrics, or certain of the diseases of women and children. An abstract of several of these papers has already been presented to our readers in our quarterly summaries of the progress of medical knowledge since the first of January of the past year. Of the remaining papers we shall proceed to present to our readers a short notice.

The address of the President, Dr. W. Tyler Smith, is occupied, mainly, by a biographical sketch of Dr. Edward Rigby, who, for the first two years of the society's existence, filled the presidential chair with great ability, and so much to the satisfaction of the members, that, at the annual meeting held on the very day his remains were consigned to the tomb, they had intended to suspend the operation of the law which limits the tenure of office to two years, in order that they might, as a mark of their high respect and approbation, elect him for the third time as their chief.

Case of Fibrous Tumour of the Uterus. By T. H. TANNER, M. D., etc.—The patient was thirty-four years of age, of fine appearance, tall, and very stout. Had been married seven years. Supposed herself to have been, but, probably, without any foundation, twice pregnant, and on both occasions to have miscarried at the end of a few weeks. Had enjoyed good health to within a few years before her death. She first noticed that her catamenial discharge became much more profuse than usual. She had then for many months occasional floodings, which gradually became more frequent, and, finally, were replaced by a continued hemorrhage from the uterus, which rendered the patient weak and exsanguine. In the beginning of June, 1855, she applied to Dr. Tanner for medical aid. She was then feeble, and nervous, with loathing of food, a weak pulse, and frequent attacks of palpitation of the heart. By auscultation of the latter organ, a systolic, anæmic, bellows sound was detected, while a venous bruit was heard in the neck. Parietes of abdomen so loaded with fat as to prevent the condition of the viscera within being detected. There was greater dulness over the hypogastric region than elsewhere, with a sense of resistance as from a solid tumour. Examination per vaginam showed that the cervix uteri was very high up, and the os very small, so as not to admit the passage of a small bougie. The diagnosis made by Dr. T. was the existence of a small foreign body of some kind in the uterus, and a tumour, probably ovarian or uterine, occupying the lower portion of the abdomen.

The patient was directed to keep quiet in bed, to take plenty of nourishment and stimulants, and twenty grains of ergot, every six hours. Under this treatment she slowly improved; at the end of about ten days the bleeding ceased. Quinine and acid mixture were then given, with a full animal diet, and she went on until the catamenia again appeared on the 9th of July. Astringents were immediately commenced with, and the discharge ceased in ten days.

From this time until the patient's death, December 28, 1860, the hemorrhage recurred at every catamenial period, and was checked with great difficulty. Astringents of every kind, ergot, opium, galvanism, the application of ice, in fact, every remedy reputed beneficial in cases of uterine hemorrhage was fully tried, but all failed, finally, to produce the slightest good effect. From the irritability of the patient and the morbid sensibility of the vagina an effective plug could not be endured over twelve hours, even when opium was administered to diminish the uneasiness. The only remedy which had any effect in checking the hemorrhage was mercury, and to it the patient owed her life on several occasions. Its good effects were equally obtained whether the bichloride was given in doses of the sixteenth of a grain every six hours, or calomel administered to the extent of producing ptyalism.

During the last quarter of 1860 the patient became extremely exhausted, and suffered much from irritability of stomach, by which she was prevented, for several days at a time, from taking anything by the mouth. Without losing flesh, she became weaker and weaker, and, finally, sunk from pure anæmia.

After death the body was found quite bloodless. The adipose tissue on the abdominal walls was two inches thick, while the vaginal labia looked like large folds of fat. The lower part of the abdomen was occupied by an oval cyst nearly nine inches broad, apparently formed beneath the peritoneum stretched upwards from the fundus uteri; it contained about a pint and a half of urinous looking fluid. A smaller cyst was also present containing two drachms of serum. The large cyst rested upon the expanded wings of the iliac bones and kept the uterus out of the true pelvis. The cavity of the uterus was found to contain a fibrous tumour, about the size of a small orange cut in two. It was attached, by its base or broadest part to the posterior wall of the uterus, and projected fully three-quarters of an inch into the uterine cavity. The other organs of the body were healthy.

The larger cyst had probably commenced in the right broad ligament, which, with the Fallopian tube, it had gradually distended. The left Fallopian tube was dilated, and contained pus—not, apparently, of recent formation.

Ovariotomy, with Cases and Remarks on the Different Steps of the Operation, and the Causes of its Mortality. By W. Tyler Smith, M. D., etc.—Four cases are related in which ovariotomy was performed by Dr. Smith, in all with a favourable result. The cases, we are assured, were in no way selected; two of them were unfavourable cases—one being of the worst form of ovarian disease, that which most nearly approaches to the character of malignancy. They are the only cases in which he has ever attempted anything beyond tapping with or without injection of iodine; and never before could he point to an equal number of distinct and positive cures of ovarian disease.

In a table compiled by Mr. Clay, showing the special causes of mortality in 150 cases of ovariotomy, 17 per cent. of the fatal cases occurred from shock or collapse produced by the operation. This source of fatality Dr. S. proposes to avoid by a more early resort to the operation. This would lessen, also, the number of cases of adhesion between the ovarian cyst and other organs. Excepting in cases where this adhesion is intimate and extensive he can see nothing necessarily belonging to the operation, which, with the use of chloroform, should produce a dangerous shock.

According to the same table 16 per cent. of the fatal cases were due to hemorrhage. All, or nearly all of these, according to Dr. S., should have been prevented by care in the application of the ligature to the pedicle, and in securing hemorrhage connected with adhesions. One source of hemorrhage has been the use of the ligature without transfixing the pedicle. Dividing the pedicle too near the ligature is another source of danger, by allowing the ligature to slip over the stump.

Not less than 43 per cent. of the fatal cases are credited to peritonitis. Dr. S. believes that the occurrence of peritonitis does not depend so much upon anything connected with the operation itself as upon miasmatic or contagious influences. Hence the greater fatality of the operation in hospitals than in private practice.

The remaining causes of fatality are of minor importance and of unfrequent occurrence. The three causes, shock, hemorrhage, and peritonitis, represent upwards of 75 per cent. of the total deaths after ovariotomy; all of them, according to Dr. S., with proper care may be in a great measure obviated.

Case of Defective Formation of Skin round the Umbilicus. By Albert Napper, Esq.—A new-born, healthy-looking boy, had on each foot a supernumerary great toe; on each hand a small additional finger, attached by a thin peduncle to the middle joint of the little finger. The thumbs were very broad with a depression down the centre, giving an appearance as if they were double. Some of the fingers and toes were webbed. Besides these deformities there was a deficiency of the integument at the umbilicus, permitting the contents of the abdomen to protrude into the umbilical cord to the size of a small orange. When the cord sloughed off, which it did at the margin of the true skin, it

left only a thin transparent membrane covering the hernia, which latter daily increased in size until it measured seven and three-quarter inches in circumference. On the twelfth day after the birth of the child an attempt was made to close the opening at the umbilicus by a plastic operation. A circular incision was performed through the skin around the edge of the tumour, exposing the peritoneal covering. In endeavouring to separate a small portion of the membrane which firmly adhered to the peritoneum, the whole contents of the abdomen, with the liver (the left lobe of which was adherent to the apex of the tumour). escaped. and were returned with great difficulty. The edges of the wound were brought into contact by means of needles and the figure of eight sutures.

The child did not appear to suffer much from pain or exhaustion. It took milk and water at intervals—the mother having lost her milk the previous day. It lay in a composed state until two o'clock the following morning, about twelve hours after the operation, when it died.

The operation in this case was solely justifiable, as offering the only chance of saving the infant's life. From the rapid increase of the hernia there was cause to fear that the membrane would quickly slough and permit the escape of the abdominal contents.

Fibrous Tumours of the Uterus treated by Surgical Means. By I. Baker Brown, F. R. C. S.—Six cases are related, with an account of the surgical treatment. These cases were, in all instances, examples of non-pedunculated tumours, and were destroyed by cutting into and destroying a portion of their tissue; in other words, by gouging out a portion of them. But one of the cases terminated fatally, in consequence, as Mr. B. supposes, of the introduction of pus into the circulation through one of the recently divided surfaces. To avoid such an occurrence in future, he, as a general rule, divides the operation into two parts. The first, division of the os and cervix uteri; the second, performed when the preliminary incisions have healed, cutting into the tumour with a view to exciting in it suppuration.

The instrument employed by Mr. B. resembles an ordinary centre-bit twisted spirally, with various cutting ends. There being a difficulty of fixing the tumour with such an instrument, Mr. P. Harper proposes one consisting of a hollow steel tube, with cutting knives. Within the tube is a hook capable of being protruded by a spring so as to seize the tumour, whilst the circular knives are carried through by means of a screw, actually cutting out a piece of the tumour. The instrument is graduated, in order that by measuring the tumour from without, a tolerably correct idea may be formed as to how far the tumour is cut into.

On Uterine Hæmatocele. By Henry Madge, M.D.—This paper gives a very excellent summary of the leading facts known in relation to this form of hemorrhage, gleaned chiefly from the French and German writers on the subject. A case is related which happened in his own practice as an example of true "retro-uterine hæmatocele." The case terminated fatally, and the appearances on dissection are detailed, and coloured drawings given of the parts involved.

This case was marked by certain peculiarities, which are thus indicated by Dr. Madge:—

"1st. The double attack at the commencement of the illness, the slight peritoneal mischief, and partial recovery, followed by the severer symptoms and protracted sufferings. Now, it seems quite possible that, if other conditions had been favourable, and the patient had not attempted to get about too soon after the first attack, everything would have gone well."—

"2d. The absence of 'tenesmus' and of 'a frequent desire to pass water.' The absence of tenesmus might, perhaps, receive an explanation in the probability that the pelvic tumour did not descend low enough on the rectum to call that symptom into existence. With regard to the bladder, as the patient always kept the recumbent posture it is not difficult to understand how the neck might have escaped the amount of pressure necessary to cause irritability."—

"3d The absence of 'fluctuation' in the tumour. The pelvic or lower portion of the tumour was at first hard and unyielding, and after being emptied of some of its contents it became rather soft and flabby."—

"4th. The absence of arterial pulsations from enlarged arteries surrounding

the tumour." The presence of these pulsations has often been observed, but not invariably.

"5th. The presence of phlegmasia dolens." This must be viewed as an exceeding rare complication of uterine hæmatocele. "When it does happen," Dr. M. thinks "it may, perhaps, be regarded as an evidence that pus in considerable quantity has been formed within the tumour, or that the blood contained in it has undergone changes of an unhealthy character, leading to phlebitis, from its absorption by the veins."

Case of Difficult Position of the Heads during Twin Labour. By T. Pollock, M.D.—A lady 25 years old, apparently well formed, at full term of first pregnancy, was seized with labour pains about 2 o'clock A.M., February 21st, 1861. At 9 o'clock, edge of os uteri very thin, but the os itself undilated; a tumour of flat bones felt presenting. By 7 o'clock P.M. the os uteri was dilated to the size of a half-crown piece, the presenting part descending into the hollow of the sacrum; the advancing part could not be accurately made out. In addition to the loose flat bones, some sharp points between them, and something resembling the coccyx, could be distinguished. Three hours later the finger thrust through the membranes discovered an anus, but no nates. Soon afterwards the right thigh and leg were brought down, and then the left. On making the proper traction during the pains to accomplish the delivery, Dr. P. found his efforts resisted by some elastic, counteracting force, causing a constant tendency in the body to recede so soon as the traction was discontinued. At length a head began gradually to pass through the vagina and out at the external parts; but, much to Dr. P.'s surprise, it proved to be the head of another child. The head of the first child was extracted in a few minutes without much difficulty. It was found that the lower jaw of the extracted child lay across the lower jaw of the one unborn, so that the side of the face and head of the one pressed on the throat and upper part of the chest of the other. Hence, the first child dragged the second down, while the second held the first back, producing the elastic resistance referred to.

The second child was soon afterwards entirely expelled, and the placenta promptly followed. Both children—boys—were born dead. The mother did well, not experiencing a single unfavourable symptom.

Presentation of Right Shoulder and Arm—Spontaneous Evolution. By Charles Mayo, F.R.C.S.—After a labour of some two days, the right arm was found presenting, with the shoulder forced down. In consequence of the powerful contraction of the womb upon the child, the several attempts at turning were unsuccessful, notwithstanding the free use of opiates and the inhalation of chloroform. After the lapse of several hours, the pains increased in violence, and the breech of the child—a boy—was expelled, speedily followed by the feet. An hour subsequently the head and left arm came away. The child was, of course, dead and exsanguine as it were from compression, excepting the right arm and shoulder, which were deeply discoloured and swollen. There were severe after-pains and the passage of considerable clots. With good care and nursing the patient recovered slowly; had little or no trouble with her breasts.

On the Indications and Operations for the Induction of Premature Labour, and for the Acceleration of Labour. By Robert Barnes, M.D.—In this very able paper Dr. Barnes has given a full history of the several means which have, at different times, been proposed for the artificial induction of labour, and for its acceleration in cases where this result is desirable and admissible. He has attempted an exposition of their respective and relative merits, while he indicates the particular cases and circumstances in which their employment may be resorted to with a fair prospect of their yielding beneficial results. Dr. Barnes' paper will be read by every one engaged in obstetrical practice with the deepest interest. Nowhere can there be obtained a more full and practical view of the subjects discussed. We regret that we shall be able to present only the general summary with which the paper closes.

"It may be stated, as a general fact, that all the means employed in the induction of labour act by stimulating the spinal centre to exert itself in causing contraction of the uterus. Some of these agents act directly upon the spinal marrow, being carried thither in the blood, such as ergot of rye, borax, cinna-

mon, and other drugs. Some evoke the energies of the diastolic system, by stimulating various peripheral nerves, such as rectal injections, the vaginal douche, the colpeurynter, the carbonic acid gas douche, probably the irritation of the breasts by sinapisms and the air-pump, the cervical plug, whether in the form of sponge tent or the caoutchouc dilator, the separation of the membranes, the placing of a flexible bougie in the uterus, the intra-uterine injection, the evacuation of the liquor amnii, and galvanism. The artificial dilatation of the cervix, the evacuation of the liquor amnii, and the intra-uterine injection act in a more complicated manner, and not simply through the diastolic system.

"Regarded from a therapeutical point of view, or in their application to practice, labour-inducing agents have been divided into—A. Those in which the integrity of the ovum is respected to the last; B. Those in which the ovum is interfered with, either by puncture or by partial detachment from the uterus. I would propose the following as a more scientific and more instructive classification: A. Preparatory measures; B. Labour-provocative measures; C. Labour-accelerating measures.

"I attach great importance to this arrangement, because I believe that in the majority of instances it is desirable not to trust to any single agent or method, but to proceed in regular gradation through the stages of preparation of the system, and of the passages concerned in parturition, the evocation of the contractile energies of the uterus, and the acceleration of delivery, selecting such means in each stage as are most suitable. I believe that much danger to the child, and some risk to the mother, may be avoided by duly preparing the vagina and cervix uteri by partial dilatation and softening through the agency of the colpeurynter and the cervical plug. These, although they will sooner or later act as provocatives of labour, are chiefly efficient as dilators of the passages. The stage of preparation completed, we may endeavour to excite uterine contraction by the vaginal douche, by rectal injections, by the partial detachment of the membranes from the lower part of the uterus, by the exhibition of purgatives. The ergot I am inclined to discard, and know that it can be dispensed with.

"If the labour hangs, if the pains are difficult to evoke, there is no necessity to abandon the patient to the tortures of suspense or the risk of accidents. We have in reserve the accelerative measures, which, the soft parts being duly prepared, place the termination of parturition entirely within our control. We may resort to abdominal frictions, the binder to support the uterus firmly against the spine, the larger uterine dilators, which are made to expand inside the cervix and to press, after the manner of the tense amniotic sac, upon the os internum uteri, the most active seat of excitation of the parturient energy; the rupture of the membranes, an operation free from all objection if performed just prior to the natural or artificial termination of labour; and, lastly, we have the operation of extraction after turning by combined internal and external manipulation, without passing the hand into the uterus. By the judicious consecutive use of these means we have it in our power to terminate a labour not only on a fixed day, but almost at a predetermined hour, and that with a greater amount of ease and security to the mother and child than has been hitherto obtained."

Substitute for Brandy in Cases of Exhaustion—Dr. Druitt's "Liquid Essence of Beef."—Lean beef, minced and then inclosed in a jar, and subjected to heat for an hour or more, separates into fat, fibre, and liquid essence. The last, being strained off, and the fat removed by means of blotting paper, is a clear amber liquid, of an intensely aromatic smell and taste, very stimulating to the brain. It is not intended as a substitute for common beef-tea, or common broths and soups, but as an auxiliary to and partial substitute for brandy in all cases of great exhaustion or weakness, attended with cerebral depression or despondency. In the sequelæ of severe and exhausting labour it is invaluable.

Case of Idiopathic Pericarditis in a Child two years old. By A. MEADOWS, M.D.—The child had been labouring for a few days under some degree of feverishness, and for a few hours before death there was noticed difficulty of breathing, with a short, hacking cough, but no indications of rheumatism. Death was preceded by convulsions. Dissection showed inflammation of the pericardium,

both layers of which were covered with delicate, soft flakes of recent lymph there was also a little fluid effused into the pericardial sac.

New Pelvimeter. Invented by L. Lumley Earle, M.D.—The instrument is a very ingenious one, and in many respects is superior to any of those which have been heretofore suggested. From a mere description, without a drawing of the instrument, its construction would not be understood.

Smallpox in Twin Fœtuses. By Henry Madge, M.D.—A lady, nearly four months advanced in pregnancy, was attacked with varioloid; not very severe or attended with any great amount of eruption. Three months afterwards she was delivered prematurely of twins. The first fœtus expelled (a male) was the smaller; the other (a female), born after an interval of about fifteen minutes, was much larger, and in some of its parts better developed. Both were affected with smallpox. The largest presented the most extensive eruption of true variolous pustules, varying in size, with central depression. The male fœtus had but six pustules on its body. They were small but perfect in form. The twins were born dead, but it was evident that life had not been long extinguished.

The foregoing and other cases on record would seem, Dr. M. thinks, to prove:—

"1st. The independent liability of the fœtus to disease, as shown by the different type of smallpox it may experience to that experienced by the mother, and in cases of twins in utero affected with eruptive disease, the much greater development of the disease in one than in the other, and, further, the possibility of only one being affected.

"2d. The nature, or rather the extent of the protective power of vaccination in adults.

"3. The necessity or advisability of recommending all pregnant women, during epidemics of smallpox, or when residing in or near a district where the disease is prevalent, to be vaccinated or revaccinated, so as to extend the protective influence of vaccination to the child in utero."

Idiopathic Pericarditis in a Child two and a half years old. By Henry Mayo, M.D.—The child died rather suddenly, without apparently suffering pain. The pericardium was distended with about four ounces of yellowish serum containing flakes of lymph, the heart was imbedded in a dense layer of the inflammatory product.

Case of Hydatid Mole expelled from the Uterus immediately after a Living Fœtus and its Placenta, at about six months gestation, the hydatid growth being the degenerated ovum of a twin conception. By J. Hall Davis, M.D.—The main interest of this case is fully expressed in the title just recited of the paper containing its history. The remarks of Dr. Davis which accompany his history will fully repay an attentive perusal.

Unusual Elongation of the Fœtal Head, as a cause of difficulty in the application of the ordinary Obstetric Forceps, with description of a modified form of instrument to be used in such cases. By G. Hewitt, M.D.—Besides the elongation of the fœtal head in its occipito-mental diameter, when it has passed through a pelvis of very small dimensions, or when the soft parts connected with it are unusually rigid, there is a change in its shape causing it to resemble rather the segment of a cylinder rounded off at the two extremities, than its natural ovoid form. This change in the fœtal head renders the ordinary obstetrical forceps difficult of application, from a want of correspondence between their curve and that of the head. Dr. Hewitt has constructed an instrument adapted, as he believes, to such cases—a drawing of which accompanies his paper. The blades have a length of eight inches, and the curve an arc of a circle of fourteen inches in diameter. It is consequently, when locked, fitted to inclose a larger oval than the ordinary English forceps.

Inflammation of the Breast, and Milk Abscess, with an analysis of seventy-two cases. By T. W. Nunn, F.R.C.S.—Of the fifty-eight lactating cases included in the list of cases of mammary inflammation given by Mr. Nunn, 33, or between 56 and 57 per cent., occurred during the first two months after delivery; during the seven subsequent months up to the ninth month inclusive, only 8 cases, or 14 per cent.; after the ninth month 17 cases, or 29 per cent. Therefore, if the liability to inflammation during the first two months be represented

by 4, then as far as Mr. N.'s observations go, the liability during the following seven months collectively falls to 1, and for the period after the ninth month rises to 2. This proclivity to inflammation after the ninth month must, according to Mr. N., be considered as an induced proclivity, having its origin in a certain condition—a special cachexia—brought about by over-lactation.

From his analysis of cases, Mr. N. has ascertained that the lower segment of the breast, compared to the other parts of the gland, has nearly double the liability to intense inflammation.

In respect to certain points connected with the treatment of mammary inflammation and suppuration, Mr. N. presents some remarks which deserve attention.

Poultices.—Their continued use from day to day—week after week—he condemns as mischievous, and a hinderance to recovery. Under ordinary circumstances he believes cotton soaked in oil, or fine lint spread with resinous ointment, to be the preferable application, both as a remedial means and from its being free from the disagreeableness of poulticing.

The recumbent position Mr. N. believes may be *rationally* insisted upon, from the consideration of the fact of the more frequent occurrence of abscess in the lower lobes of the mammary gland.

Belladonna as an ointment Mr. N. has employed on many occasions, but without any encouraging results. Several patients under its use complained of an increase of pain.

As to the *time proper for opening a mammary abscess*, a too early and free incision involves excess of pain and hemorrhage, while delay beyond a certain point risks the sloughing of the integument and the torture from spontaneous perforation.

From the pain caused by any attempt to detect fluctuation by the ordinary manipulation in cases of inflamed mamma, Mr. N. trusts to these indications afforded to the eye alone—the protuberance and tension, the glazed surface and peculiar colour of the skin over the seat of the abscess.

In the treatment of the sequelæ of mammary abscess, in sinus of the breast, and the painful œdema so apt to remain after the more acute phenomena of inflammation have subsided, a weak galvanic current, such as is afforded by the single cell apparatus in ordinary use for administering the interrupted current, he has found eminently beneficial.

The three following cases are interesting and proper to be recorded, but present no features of particular importance in respect to diagnosis or practice. They are—one of *Fibroid Tumour springing from the Posterior Lip of the Uterus, causing Complete Prolapse, and simulating Inversion of the Uterus.* By ROBERT BARNES, M. D. One of *Glandular Cystic Tumour of the Mamma.* By Mr. SQUIRE. One of *Ovarian Tumour removed by Ovariotomy.* By Mr. SPENCER WELLS.

Four Cases of Ovariotomy. By W. TYLER SMITH, M. D.—The history of these four cases is intended as an appendix to the paper read at a former meeting of the society and already noticed. Three of the cases terminated favourably.

Pelvic Cellulitis after Second Pregnancy, followed by Suppuration in the Left Groin and Left Antero-Superior Femoral Region. By N. C. HATHERLY, M. D.—A female, twenty-nine years old, of leuco-phlegmatic appearance; married for seven years; delivered of her second child September 8, 1858. Her labour was easy and speedy, and her getting up favourable. About five weeks after confinement she experienced an inability to walk from increasing stiffness and slight pain of left groin and left abdominal region—nothing unusual could be detected upon examination. In a few days afterwards there was difficult and somewhat painful micturition. The only constitutional symptom was a very anæmic appearance. She was ordered poppyhead stupes with anodyne poultices; an occasional Dover's powder at night, with quinine and iron during the day.

Dec. 5th. Slight fulness above the centre of Poupart's ligament of left side, of doughy feel, not easily defined; not over tender, complains of some pelvic fulness. Vaginal examination showed only unusual sensitiveness of canal. Rigors eventually set in, and suppuration gradually advanced. Tumour in-

creased in size and became acuminated. Considerable irritative fever. Secretion of milk had gradually ceased. On the 20th, a valvular opening was made, which gave discharge to twelve ounces of healthy pus. On the 25th, the discharge suddenly ceased, and pain set in in the upper left femoral region opposite the saphenous opening. On examination it was evident a fluid was collecting there; the tumour rapidly increased, spreading downwards and laterally. Jan. 1. By a valvular opening in the most depending part the pus was partially evacuated. Ordinary treatment pursued. 5th. Symptoms of pyæmia; pulse very feeble, averaging 130 in a minute; nausea and great prostration. At the end of three days patient began to rally—discharge decreased—daily improvement under use of very generous diet, alcoholic stimulants, tinct. ferri sesquichlor. and quinine.

The wound healed in about a month; at the end of twelve weeks went out for a drive—continued to progress steadily. Catamenia reappeared in the fourth month. Considerable stiffness of the hip-joint remained for nearly six months, when she was again able to walk about pretty well. She became again pregnant in about twelve months, and was safely and easily delivered of a fine child, and recovered without any untoward symptom.

Historical Notes on Displacement of the Unimpregnated Uterus as a Cause of Displacement of the Gravid Uterus. By J. H. Aveling, M.D.—Dr. A. attempts to show that the fact of displacement of the pregnant uterus being the result of a similar condition of the non-pregnant organ was known to Morgagni, and was pointed out by him more than a century ago; and that since his time it has been adverted to by several members of the profession without their being aware, seemingly, that it had been previously noticed by any medical writer.

When the paper was read before the society Dr. Tyler Smith remarked that, with the exception of Dr. Aveling's quotations from his paper of November, 1860, those from every other writer referred entirely to the different forms of lateral obliquity of the pregnant uterus. Only one of the authors cited spoke at all of retroflexion, and that in a purely speculative manner. Dr. Smith's view, as opposed to that of William Hunter, that retroversion of the gravid uterus was caused by the impregnation and development of the previously retroverted organ, was published in 1856, and, he remarked, it has not been shown that this fact was understood by any previous writer.

The Influence of Abnormal Parturition, Difficult Labours, Premature Birth, and Asphyxia Neonatorum on the Mental and Physical Condition of the Child especially in Relation to Deformities. By W. J. Little, M.D.—The deformity to which Dr. L. especially refers, and an exposition of the pathology of which is the chief object of the present paper, consists in a tonic rigidity and ultimate structural shortening, of varying degrees, in a few or many of the muscles of the body. Both lower extremities are more or less generally involved. The muscles of the neck, upper extremities, and trunk, may be affected either singly or several of them at one and the same time.

Dr. L. presents in tabular form an analysis of sixty-three cases of children, of whom forty-seven were affected with spastic rigidity, chiefly of the muscles of the extremities, after abnormal or premature labour, or congenital asphyxia; two with wry neck from abnormal labour or congenital asphyxia; five with spastic rigidity, suspected to be from asphyxia neonatorum; four with muscular debility, or paralysis from abnormal or premature labour or asphyxia; two with convulsions from asphyxia at birth, followed by paralysis; one with imbecility from congenital asphyxia: and one with spastic rigidity and imbecility from, it is supposed, embarrassed breathing; while of one case the post-mortem examination is given to illustrate the production of apoplectic capillary congestion in a child born without pelvic obstruction at birth.

Doubtless, Dr. L. admits, there was in some of the cases he has recorded sufficient mechanical injury to the head and neck inflicted to account for whatever unfavourable consequences, whether these were fatal or not, may have ensued; but he is convinced, the more the facts he has adduced are studied the more apparent will it be that a larger proportion of infants, either dead, still-born, apoplectic, or asphyxiated at birth, have been rendered so by interruption of the proper placental relation of the fœtus to the mother, and non-substitution

of pulmonary respiration than from direct mechanical injury to the brain and spinal cord. Dissection has shown the important fact that mechanical injury of the fœtus is not necessary for the production of intense congestion and blood extravasation of the serous surfaces of chest, brain, and spinal cord.

"The other phenomenon commonly observed in difficult and abnormal parturition is that of interruption of *placental* respiration and circulation with non-substitution of *pulmonary* breathing and circulation. To this phenomenon alone, when mechanical injury or impediment has not existed, can we attribute the internal congestions, capillary extravasations, serous effusions which correspond with or produce the symptoms of asphyxia, suspended animation, apoplexy, torpidity, tetanic spasms, convulsions of new-born children, and the spastic rigidity, paralysis, and idiocy subsequently witnessed."

The paper of Dr. Little is a very valuable one; he has handled his subject very fully and with great ability. It must be received as an important contribution to infantile pathology.

New Instruments for the Removal of Uterine Polypi, &c. By J. BRAXTON HICKS, M. D.—The principle of these instruments is the application of annealed steel wire to a modification of the screw êcraseur. They may be considered as a decided improvement on the instruments in common use. Their construction and the mode of using them will be readily understood by the description given by Dr. H. in connection with the drawing that accompanies it.

Polypus of the Uterus, Pendulous in the Vagina, removed by the Ecraseur. By G. HEWITT, M. D.—The interest of this case arises from the fact that its real nature had been for a long time misunderstood—it being taken for a falling of the womb—and the patient, in consequence, subjected to a futile and erroneous method of treatment. The pedicle of the polypus was found, after removal, to be about half an inch thick. The only inconvenience experienced by the patient during the removal of the tumour was just at the last, when a severe pain was complained of, due, as it appeared, to the traction of the pedicle on the wall of the uterus. There was no hemorrhage, and the patient made a perfect recovery.

Five Cases of Ovariotomy. By I. BAKER BROWN, Esq., F. R. C. S.—These cases make a total of fourteen operations for ovariotomy performed in the London Surgical Home, of which ten have been successful.

Female Bladder showing the Results of Retention of Urine after Delivery. By T. SPENCER WELLS, Esq., F. R. C. S.—The patient, 22 years of age, was delivered of her first child August 20, 1860. Retention of urine ensued, to which no attention was paid for two days, when an unsuccessful attempt was made to pass the catheter. Twenty-four hours afterwards five pints of turbid, bloody urine were drawn off. The catheter was now introduced two or three times a day for some time. The urine became ammoniacal, and remained so. Involuntary dribbling of urine, without any fistulous opening, set in in the beginning of September, and, after a train of very distressing cerebral symptoms, the patient died October 16th.

After death the coats of the bladder were found thickened and lying loose in the cavity. It contained a mass composed of the entire mucous membrane detached from the muscular coat, and covered on both sides with a deposit of urinary salts. Microscopically this mass might be described as degenerate epithelium holding a saline deposit. On boiling a piece of it in twenty pints of water to one ounce of acetic acid, much of the saline matter was dissolved, and some of the tissue became clear, having the appearance of smooth muscular tissue which has begun to degenerate by the deposit of fatty or albuminous particles in its substance.

On Vaginismus. By J. MARION SIMS, M.D.—By the term vaginismus Dr. Sims proposes to designate an involuntary spasmodic closure of the mouth of the vagina, attended with such an excessive supersensitiveness as to form a complete barrier to coition. The most perfect examples of vaginismus Dr. S. has met with were uncomplicated with inflammation. He has met, however, with cases in which there was a slight redness or erythema at the fourchette, just without the reduplicature of the vaginal mucous membrane called the hymen. The latter is usually thick and voluminous, and when the finger is passed into the vagina its free edge often feels as resistant as if bound with a fine cord or wire. The gentlest touch with the finger, or even a feather, produces the most excruciating

agony. The sensitiveness which is at all parts of the vaginal outlet, is especially pronounced at the meatus urinarius and on each side of it, still more so on the outer face of the hymen, near the orifice of the vulvo-vaginal gland, and to the greatest extent just in the sulcus or reduplication from the vulval orifice. In all cases the mere spasm of the sphincter is painful, and in many cases the sphincter ani feels almost as hard as a ball of ivory. The spasm is pathognomonic of the disease, the supersensitiveness diagnostic.

The treatment proposed by Dr. S. consists in the removal of the hymen, the incision of the vaginal orifice, and its subsequent dilatation. For a description of the operation and of the instrument employed by him as a dilator, we must refer to the paper itself.

Case of a Patient who in Eighteen Pregnancies gave Birth to only Seven Living Children, the eleven others having been expelled dead at various periods of Gestation. By W. Newman, M. D. The circumstances connected with this case would seem to point very clearly to a cause of death in the fœtus that has been too frequently overlooked, namely a want of formative power on the part of the mother, which in the case detailed increased with each succeeding pregnancy.

Case of Abortion: Retention of Ovum within the Uterus, and Growth of Membranes for a Period of Five Months after the Death of the Fœtus. By G. Hewitt, M. D.

Knot on Funis, in a Case in which the Fœtus was born dead. By W. Sankey, Esq.—The titles of these two papers explain fully the leading character of the cases described in them.

Instrument for the Removal of Polypi of the Uterus. By Tyler Smith, M. D.—It consists of a rod and winch with double canula, made sufficiently strong to carry a single or stranded copper or iron wire, and bear tension enough to cut through the neck of a polypus at once.

Case of United Children, or Double Monstrosity. By Henry Hawks, L. R. C. P. Ed.—The heads of the children were covered with hair. Each of them possessed two arms and two legs, with perfect fingers and toes. There was a single thorax, in which were two lungs, one pericardium, and one heart. The abdomen was common to both children, with a single liver and spleen, one set of intestines, and two kidneys. There were two urinary bladders. The union of the child was from the top of the sternum to the umbilicus. The length of one was eighteen inches, of the other seventeen inches; they measured eighteen and a half inches round the shoulders; weight sixteen and a half pounds. They appear to have been both females.

Case of Peritonitis caused by Escape of Pus or Putrilage from the Fallopian Tube into the Abdominal Cavity, following an Abortion artificially induced. By Robert Barnes, M. D.—This case, with the introductory notice of cases of a similar character, is replete with interest. It will not admit well of abridgement, and this article has been already extended to too great a length to admit of its insertion entire.

A very valuable practical paper is presented by Mr. Robert Ellis, on *Cauterization by Electric Heat in certain Diseases of Women*, to which we would call special attention. The subject is a most interesting one, and is ably handled by Mr. Ellis.

Case of Inguinal Hernia of the Right Ovary successfully removed. By A. Meadows, M. D.—Cases of a similar character are extremely rare. The present one was among the first in which an operation was attempted. The operation was in all respects successful. It is suggested that, had the patient been seen when the accident first occurred, or at least after the first menstrual period, when severe pain was experienced in the tumour, its nature might even then have been diagnosed, and its replacement happily effected either by the taxis or by operation.

The volume closes by the history of a *Case of Congenital Inflammatory Disease of the Skin of the Head and Upper Part of the Body of an Eight Months' Fœtus, with Exudation of Plastic Lymph.* By G. D. Gibbs, M. D.

D. F. C.

ART. XXI.—*Public Health in Relation to Air and Water.* By W. T. GAIRDNER, M.D., Fellow of the Royal College of Physicians, Edinburgh; Physician to the Royal Infirmary, and Lecturer on the Practice of Medicine. 12mo. pp. 369. Edinburgh, 1862.

THE present volume embraces the substance of a course of lectures delivered during the summer of 1861, to an audience composed partly of students of medicine, and partly of persons otherwise interested in the subject of public health. These lectures were undertaken by Dr. Gairdner, mainly to communicate some of the elementary principles of modern sanitary science to those whom he had instructed in the science and the art of healing, in order to complete, as he conceives ought to be completed, the cycle of sciences on which the art of healing rests; while, at the same time, he endeavoured to establish a cordial understanding between the medical profession and the community at large on the subject of public hygiene—to claim for the physician the due influence which he has a right to exercise in relation to all sanitary reforms, from his legitimate position as a conservator of the public health, and the labours he has already performed in respect to its maintenance and increase, and, finally, to effect something towards establishing the claim which the study of public hygiene presents as a department of medical science.

Although the arrangement of these lectures and the manner, generally, in which the subjects embraced in them are handled, may be amenable to criticism, nevertheless, the principles set forth by the lecturer are unquestionably sound, while his hygienic deductions from those principles are correct and practical throughout, and of universal applicability. His teachings are based chiefly upon facts derived from the rich mine furnished by the Registrar General's reports and those of the Health of Towns Commissions. By a careful collation of the statistics contained in these reports, compared with those derived from observations upon the same points collected in some of the larger continental cities, we are enabled to arrive at certain positive data that have caused modern sanitary science to pass out from "the stage of the hypothetical, and become a strictly inductive and closely reasoned branch of knowledge, resting upon a solid basis of experience."

Dr. Gairdner was induced to make the consideration of air and water as sanitary agents, the leading subject of his lectures on public health, from the fact that these two essential elements of life, when contaminated with the effete products of the human body, or with organic matter in a state of decomposition, may be denominated the two factors of almost all endemic and epidemic diseases as well also of a large number of chronic maladies. Hence, in the management of the supply of pure air and pure water is included almost the entire sanitary code.

"When," as the lecturer aptly remarks, "you get air and water systematically purified, you have not only begun, but you have advanced far in the work of sanitary reform. You have, indeed, done the greater part of all that you can do in the way of legal interference in regard to public health. It is, therefore, very important you should thoroughly grasp the ideas connected with the purification of air and water. The health and the morals of the population here hang by the same thread; for though I am not about to argue that men are moral or immoral simply as the creatures of circumstances, yet there can be very little doubt that the physical circumstances in which men are placed often dominate to a vast extent their moral health. They do so at all events to this extent, that without a certain degree of purity of air, water, and person (and the last is the result of the other two), self-respect, and respect for others, which are the foundation of the moral code as between man and man, become impossible. And, therefore, literally and truly, as was said long ago in the way of proverb, 'cleanliness is next to godliness.' Nay, even godliness itself is not a little dependent upon cleanliness when you speak of large numbers of men."

As the main physiological elements of health Dr. G. enumerates pure air, pure wholesome water, plenty of light and warmth, good food, sufficient and proper

clothing, a comfortable home, fitting occupation—including in the case of artisans and mechanics a wholesome condition of workshops—a proper relation between the sexes—the right cultivation of domestic habits, and of the natural social affections; and, finally, a sufficient amount of relaxation and amusement at proper intervals, including, under the head of relaxation, the important item of absolute rest and sleep. By quotations from the English health reports Dr. G. has shown the important relation which these different conditions of health bear to one another, and, especially, the immense extent to which "the comfort of the home and of the workshop, as respects the single first element of health, proper ventilation, is found to enter into all the more complex developments of the other essential conditions of health, so that without proper ventilation, and the closely allied conditions of good drainage and sewerage, it is impossible to expect that any of the other great vital necessities can be properly or even moderately well attended to."

Another reason why, in treating of public health, Dr. G. considers that our chief attention should be directed to a consideration of air and water as sanitary agents, is founded upon the circumstance that, to secure to the whole community and to each individual composing it, a constant supply of these first requisites of health, and in a state of as perfect purity as can be attained, legal interposition is not only perfectly justifiable but is actually demanded.

"Our food, our clothing, our dwellings—that is to say, the walls and the furniture of them—are personally ours," the lecturer remarks, "in a sense in which air and water are not. Air and water belong to no man, they belong to all men. We have all a right to use them, but we cannot confine the use of them, or even of any portion of them, to ourselves; and just because God has given them in free unstinted measure, as a common gift, to all the inhabitants of the earth without distinction, just because of this we have all a right to use them, while none of us has a right to abuse them. And, furthermore, each one of us, as an individual, and the community as representing the whole mass of individuals, has an indefeasible right to see that no individual of the community does abuse them to the possible injury of the rest."

From these premises Dr. G. deduces the right of authoritative interference, if necessary, in regard to air and water. It may be a question of expediency or of possibility in any particular case as to how far we can carry that right; but we have, he insists, in theory the right, as a community, to interfere to the full extent necessary to preserve the greatest attainable purity of air and water to every member of the community.

Dr. Gairdner believes that, from what we know of the history of those diseases which are called epidemic or pestilence, we have a right to conclude their occurrence is not a necessary or unavoidable thing, but a thing which, by care and attention to the conditions of health, we can get rid of to a great extent, if not entirely. We have a right, he maintains, to believe that pestilence may be rooted out absolutely from the entire community, because we find that in practice many epidemic diseases have been entirely rooted out in respect to large sections of the community, by attention simply to the purity of air and water; and, consequently, that we should not relax our efforts until we have got rid of epidemic diseases entirely. He believes that we are, to a certain extent, justified by facts in looking upon the mere existence of such diseases—not, perhaps, in every case, but certainly in the great majority of cases—as the evidence —plain and undeniable evidence—of a violated law; a law which requires of us to abstain from everything that is calculated to detract from the purity and free circulation of air and water. Impurity and stagnation of these primary elements of healthful existence being, in his estimate, the main predisposing cause of all those diseases commonly known as epidemics.

Mere impurity and stagnation of air and water can scarcely, we think, be viewed as the generating or efficient cause of all affections of an endemic or epidemic character. Many of these owe their origin to a certain morbific something connected with the atmosphere at particular periods, and which more or less gradually extends itself in certain directions and over different extents of the earth's surface. Of this morbific principle we know nothing, its presence being shown only by the pestilence to which it gives rise. Now, though it is

very certain that it may be invited, as it were, to a particular locality or district, and the intensity of its action augmented by certain appreciable conditions of atmosphere, including its stagnation and vitiation, yet, in numerous instances, the influence of the morbific poison will be experienced when the movements of the air and water are unrestrained and no sources of vitiation in respect to either can be detected. As Dr. G. well remarks—

"Neither a bad smell, as such, nor sulphuretted hydrogen, as such, nor carbonic acid, as such, contains the special poisons which we have to fear particularly as the sources of epidemic disease. But all of these are, to a certain extent, indications, beneficent, providential warnings plainly given us—to view the matter from the aspect of final causes—to bring before our very senses the circumstances under which dangerous poisons may perchance be present. Such poisons may not be present in ninety-nine cases out of a hundred, where the air is manifestly impure to the senses, or saturated with gases which are the known products of organic decomposition, but in the hundredth case you may have a true morbid poison there present, and then it is a most deadly poison; and this we can certainly say, that if we had not had the excess of carbonic acid, nor the sulphuretted hydrogen, nor the bad smell, in all probability we should not have had the dangerous element present either. The same law applies to water. Water, as I showed you in my first lecture, contains, in some cases, those morbid poisons which we have to fear as the causes of disease. It is the medium, for instance, in some cases, of that dreadful poison of epidemic cholera; and of some other diseases it is probably the principal medium. But we can study the process most conveniently, perhaps, in the case of the smallpox pustule, which contains a very terrific poison in small bulk, and so constituted as to act upon the fluids of the human body by becoming dissolved in water; or, again, in the cowpox pustule, which is really only another, though a far more benign form of smallpox. In these cases we have the whole of the facts in relation to a most virulent and active source of disease under our daily observation and control. We know of a certainty, in the little, seemingly insignificant, droplet of watery fluid inserted into the arm by the inoculator, is inclosed the specific poison of smallpox or cowpox. We know, therefore, that such poisons exist, that they are specific poisons which cannot be chemically analyzed or mechanically weighed or measured; that an infinitesimally small amount of them, in fact, will produce the disease. We know that they may possibly exist wherever water or air contain certain organic impurities, with which the specific secretions or exhalations of persons suffering under disease may have been in contact. We know, on the other hand, that these poisons cannot exist where there are no such impurities; that is nearly all we know about them. And, therefore, although you may not be able to demonstrate that a *particular* organic impurity in water is poisonous, although you may even be able to bring a strong body of evidence to show that it is not poisonous; yet, wherever you have a considerable amount of organic impurity habitually present in water, as in air, depend upon it you have some of the conditions in which these peculiarly evanescent and dangerous poisons may possibly lurk unseen."

To impurity of air and water Dr. G. refers, not only as the chief predisposing cause of epidemic diseases, but as causes, to a large extent, of other diseases. In proof of this latter position the lecturer confines himself to the etiology of two diseases, pulmonary consumption and infantile convulsions. The influence of impure and stagnant air as a cause of convulsions and other serious affections, by which, annually, in all our larger cities, a very large amount of mortality among infants is caused, is so well understood by the medical profession in this country, that it is only necessary here merely to advert to it. The dependence of pulmonary tuberculosis upon a foul and stagnant atmosphere is, however, not so generally recognized. That, in conjunction with the want of a due amount of active exercise, and more especially with a constrained position of body long continued, it may play an important part in the etiology of tuberculosis is, however, by no means an improbable supposition.

In the essay of Dr. Baly on the mortality of prisons (*Med.-Chirurg. Trans.*, 1845); in the report of the commissioners on the health of the army, appointed after the Crimean war; and in the reports of the Consumption Hospital at Bromp-

ton, will be found a series of facts showing that a want of ventilation of houses, workshops, and unquestionably, in many instances, of schools also, may be fairly set down as contributing towards the production of a large amount of the mortality incident to pulmonary phthisis and the other forms of tubercular disease. In 1824, Dr. Alison, in a paper published in the first volume of the *Edinburgh Medico-Chirurg. Transactions*, endeavoured to prove that confinement, and want of exercise, rather than cold or deficient nourishment, are the causes of tubercular disease. The dependence of the latter upon vitiated air was also maintained by Baudelocque in his treatise on scrofula, published in 1834; and the same has been recently urged by Dr. M'Cormac, of Belfast, Ireland. Mr. Toynbee has observed that, among the working classes of London, while scrofulous and tubercular diseases are the result of ill-ventilated dwellings and workshops, in connection with destitution and an imperfect supply of food, gouty and rheumatic disorders prevail among those who are driven by the physical exhaustion caused by working in an impure air to the use of alcoholic stimulants.

In his evidence before the Health of Towns Commission, Dr. Guy stated that he had investigated with great care the circumstances attending the derangement of health in 320 of the journeymen printers of London. After careful inquiry he was enabled to arrange them in three classes nearly equal in numbers. In the first class, the men habitually respired in their workshops an atmosphere of less than 500 cubic feet of air per man; in the second class, the quantity was between 500 and 600 cubic feet; in the third class, it was over 600 cubic feet. Taking as his guides, two of the leading symptoms of consumption, which could be easily detected by questions, he found that the difference between the first and last of the above classes was as follows: Of the *first*, or *worst* off class, as respects air, 12½ per cent. had spat up blood, and a like proportion had been subject to catarrh; while, of the *third* or *best* off class, only 4 per cent. had suffered from spitting of blood, and only 2 per cent. from catarrh. The medium class of workmen occupied also a similar medium position with respect to both these unfavourable symptoms. In connection with the foregoing facts, Dr. G. remarks: "As the differences are considerable between the comparative frequency of scrofulous diseases, and of internal tubercular affections in different localities, there must in all probability be some unknown specific cause of each, to the activity of which a defective air supply is an essential, or nearly essential condition. In connection with this obscure subject, it should not be overlooked, that the contagious or infectious character of consumption has at different times been a popular belief, and has also found favour with many good medical authorities, although more usually set aside as deficient in evidence. Without wishing to dogmatize on the subject, I think it must be conceded that the frequent occurrence of the disease in connection with bad ventilation, is rather in favour of the view of some degree of contagious property, and ought to inspire reasonable caution as regards the too close approximation of the sick to the healthy. A pure air by day and by night, is the only safeguard against this danger, if it really exist, and considering the lamentably frequent instances of the wide diffusion of the disease in families—though this does not necessarily presuppose contagion—no precaution should be neglected that is consistent with the humane and attentive nursing of the sick."

The volume before us comprises seven lectures. The first, or introductory, refers to the care of the public health as a medical function. The attention paid to it in early times; the minute sanitary requirements of the Jewish ceremonial law—a law which may in very many and important particulars be made even at the present day our exemplar and our guide. The Roman sanitary legislation is also cursorily noticed. The neglect of almost everything relating to hygiene in the middle ages is commented on, and its consequences pointed out, by a reference to the widespread contagious and other epidemics, which so repeatedly desolated, at intervals, during this period, most of the large cities—cities which appear to have been built and governed with the express intent of excluding as much as possible the circulation of the air, the entrance of the sun's rays, of crowding in as small a space as possible the inhabitants, and of surrounding them with all manner of uncleanliness. The lecturer presents then a rapid but most instructive sketch of the gradual and partial reform which was

at length brought about through the more careful study of certain epidemic diseases by a few zealous physicians, and the revelations made by Howard and others in respect to the condition of the jails, hospitals, and lazar-houses of England; until, in the present century and within the last thirty years, the public mind being strongly and universally directed to the origin and suppression of pestilential diseases, through the labours of Mr. Chadwick and his colleagues, a series of investigations were instituted and effectually carried out to determine from actual observation the sanitary condition of the labouring population, and of the principal cities of Great Britain. From the results of these movements, taken in connection with the body of vital statistics, contained in the reports of the English Registrar-General, Dr. Farr, have been developed the leading data upon which alone must be based a successful system of sanitary organization, public as well as private, having for its object the security and augmentation of the health of all classes of society, in every community, and the prevention of pestilential diseases in their midst.

The second lecture takes up the subject of public health, in connection with air and water as sanitary agents. In this portion of the course we are presented with some general views in relation to the causes of the deterioration from the requisite purity of these two essential elements of health, and the natural processes by which that purity is restored and maintained.

The impurity of the air and water in particular houses, cities, and other localities, is no doubt chiefly due to overcrowding, and to defective ventilation and drainage. In consequence of such neglect, the impurities given off by the human body in the course of its regular physiological functions, or generated during the various processes instituted by man for his personal and domestic comfort, and in the course of various industrial pursuits, by the neglect of cleanliness, also, and the consequent retention of organic remains in a state of decomposition about his person or premises, must necessarily be allowed to accumulate within a comparatively small compass. With perfect ventilation and adequate drainage, these impurities would have been speedily dispersed and made to undergo by means of the subtle chemistry of nature such changes as were required to render them supporters, instead of disturbers or destroyers of vitality.

To secure adequate ventilation and drainage would appear, therefore, to be among the primary means to be instituted for the maintenance of health in the individual and the warding off of pestilential disease from communities. Such is certainly the case, whenever by ventilation we introduce a constant current of pure air in and around our dwellings. For we are to recollect that the very air which is caused to flow into our dwellings, our workshops, our school rooms, our churches and other places of public resort, may be itself the means of communicating disease, from the impurities it has imbibed in its passage over places in our vicinity where there exist sources of morbific emanations. A city, or village or tract of country may be rendered eminently unhealthy if it be so situated that the prevailing winds traverse an extensive malarious district, or one abounding in marshes or large collections of stagnant water. So, also, drainage and the removal of every species of obstruction in our streams and water-courses generally, however fully accomplished, though always productive of beneficial effects in a sanitary point of view, will not alone always supply us with pure potable water. The sources of the water may be such as to cause it to be impregnated with saline or other ingredients, or these may be poured into it along its course in such quantities as to render it unfit for use as a drink.

The subject of impure air and overcrowding is very well treated of in the third lecture. Its influence as a sanitary agent is amply illustrated by frequent reference to the facts developed in the reports of the Health of Towns Commission, especially those in regard to Liverpool.

In the conclusion of this lecture Dr. G. makes the following highly important remarks:—

"The great evil that we have to fix upon, as a guide to the purification of the air, is the fact of epidemic disease in connection with overcrowding. But, although that is the form we must chiefly fix upon, I am not at all sure that epidemic disease is the form of evil that does the most damage to the public health. A vast amount of mischief is caused, no doubt, by the spread of such

a disease as typhus fever, which too often cuts off the head of a family. A somewhat less, but still a considerable amount of evil is produced by the diseases of measles and scarlet fever, which often destroy the children of a family, and in many cases, where the children are not destroyed, leave them with a weakened vitality, which lessens their value and usefulness as members of society all the rest of their lives. But, I am not sure that even a greater amount of physical deterioration is not produced by the tendency of overcrowded apartments, and a deficiency of free ventilation, to sow the seeds of tubercular disease, and particularly of pulmonary diseases of all kinds. *** Knowing, as we do, that from a seventh to an eighth over all England, and probably from a sixth to a fifth, or even a fourth, of the population that die in some of the great towns, fall victims to some form or other of tubercular disease—whether this does not present even a more terrible picture than the other, of the consequences of deficient ventilation. In the case of consumption, alone, we are dealing with a disease which annually destroys more than 50,000 persons in England and Wales, and we are very sure that a large proportion of this immense mortality is an avoidable mortality, inasmuch as we know to what an extent it occurs in close and unwholesome houses, workshops, schools, and places of public resort. If the prevalence of this one disease could be reduced, say by one-half, or even one-third, through systematic attention to the principles of public health, it would be far more than worth, in mere money value, a sum equal to the interest of the national debt."

The subject of the next two lectures—the fourth and fifth—is water in reference to public health. The necessity of an adequate supply of water for culinary purposes, for the maintenance of personal and domestic cleanliness, and as a beverage, is pointed out, and the importance of the supply being of water of the purest quality that can be obtained, especially in reference to its use in the preparation of our food, and still more so as our common drink, is strongly enforced by Dr. G.

In the fourth lecture, which treats of the water supply and the injury which must necessarily result when this is deficient, there are announced many general truths which are applicable alike to every community, nevertheless, most of the facts, arguments, and illustrations of the lecturer, under this head, have more especial reference to the water supply of Edinburgh and London. They are but partially applicable to the leading cities of the United States, in nearly, if not all of which an ample supply of water is furnished, and at so small an annual expense, that even the poorest individual or family may avail himself of it, without stint, for every purpose for which it is required.

The subject of impure water is discussed in lecture five. The causes by which water may be rendered impure, and thus unfit for the use of man, are numerous. The great majority of them it is within our power entirely to remove. It is chiefly those causes through which the water becomes loaded with organic remains in a state of decomposition that render it the most prejudicial to health. Hence the well-founded prejudice against the use of the water of marshes, shallow ponds, and, indeed, against the use of water that, in any situation, has remained for a long time stagnant. Hence the unwholesomeness—an unwholesomeness frequently but little suspected—of water that has passed through a soil which has become strongly impregnated with decomposing animal remains, and exuviæ; a soil too often to be met with in the midst of large cities with their numerous ill-constructed sewers, cesspools, and graveyards.

The principal circumstances under which water becomes dangerously impure, are enumerated by Dr. G. as follows: *First.* When a neighbourhood, situated at a lower level than the other portions of the city, town, or village, to which it appertains, receives the entire drainage of the higher grounds. *Second.* When the drainage is defective, or the drains and common sewers are so constructed as to leak into the subsoil, or to become choked, so as to cause their frequent overflow. *Third.* When the drainage is into a river or stream from whence, and within the poisonous influence of the sewage, comes the water supply of the people. *Fourth.* When there is no proper or adequate system of drainage, impurities being allowed to accumulate upon the surface and soak into the soil, while the leakage from cesspools is widely diffused throughout the subsoil so as

to contaminate the water courses and wells from which the water supply is obtained.

The lecturer adduces many striking facts, proving most clearly the influence of impure water in the production of endemic and epidemic diseases—of cholera, dysentery, and various other maladies of a very serious and deadly character. He strongly enforces the view which refers the dissemination of cholera chiefly to the use of water impregnated with a particular poisonous matter. With the view of establishing the correctness of this view, he attempts to show by facts, the accuracy of which cannot be disputed, that cholera is a disease of low levels, but not of all low places and low levels even within the geographical limits invaded epidemically by the disease, thus showing that other and opposite tendencies are sometimes at work in particular localities. In respect to cholera, he remarks:—

"We want a cause of disease which is consistent with its communication from man to man, and along the great lines of human intercourse, yet which does not imply a large amount of contagious or infectious power, in the ordinary sense of a disease which is 'catching,' through the breath or exhalations of the skin; a contagion, in short, which allows of your approaching the sick, or remaining in the same room with them, with little danger as compared with the case of fever or of smallpox. All these conditions are met by the theory of a poison communicated from the sick to the healthy, but communicated chiefly through water, and only to a comparatively slight extent through the air. This, accordingly, is the modern theory of the diffusion of cholera. We have come to believe that it is, indeed, as the Hindoo supposes, a disease dependent upon poisoned water, only the poison is not an extraneous one, but is generated and reproduced in and by the bodies of the sick."

The subject of drainage and sewerage are treated of in a very general manner in the sixth lecture. In the seventh is discussed at some length the subject of sanitary organization. That is an organization having for its sole object the promotion of the public health of the community generally, by devising and procuring such legal enactments for the security of the public health as may be found necessary and proper; by co-operating with the State and municipal officers in the enforcement of the measures which these enactments provide for; by securing to every neighbourhood, family, and individual, in the community, a constant and adequate supply of pure air and pure water; by communicating, as far as is possible, to every class of the people, advice and instruction in regard to such a mode of living, within their means, as shall the most certainly conduce to their health and well-being; and to place within the reach of all the means for regular bathing, proper, economical, and wholesome cookery, and the accommodations furnished by improved boarding, and tenement houses.

The leading facts and arguments employed by Dr. G. in the illustration and enforcement of the principles laid down by him in these concluding lectures, are derived almost exclusively from the condition of the people in the different cities, towns, and villages of Great Britain. While his reformatory measures, and the manner in which he proposes to secure their accomplishment, have reference mainly to the poor and labouring classes of that kingdom, they will, nevertheless, be found, to a very great extent, applicable also to the condition of things which prevails amid the several communities of the United States. The discussion of the subjects referred to by Dr. G. presents much that is highly instructive. His fifth and sixth lectures, equally with those which precede, deserve a careful study on the part of every one interested in the etiology of disease, and who would desire to promote the inauguration and enforcement of measures adapted to remove the causes of endemic maladies. Although these measures cannot effect as much in respect to those maladies which prevail epidemically, they will be found, at least, to disarm them of their malignancy, and circumscribe to a great extent their prevalence.

To each of the six lectures a series of notes are appended in reference to subjects of deep interest to the sanitary reformer, and a familiarity with which is calculated to promote the cause of public health.

We may here remark that the volume before us does not contain all the lectures which composed the course as actually delivered by Dr. G. Five lectures

are omitted from the fact of their being exclusively devoted to the mere technical and scientific consideration of the various circumstances bearing on the death-rate, and on the application of the Registrar-General's data to sanitary purposes.

Notwithstanding the length to which we have already extended our notice of the lectures of Dr. Gardner, we cannot refrain from laying before our readers an extract or two from the recapitulation with which the sixth lecture concludes. They speak most solemn truths in respect to the important subject of public hygiene, which cannot be too often urged upon the attention not merely of physicians, but of our State and municipal legislators, and of the citizens generally.

"I cannot close this lecture, and with it the review of the consequences of our neglect of the first elements of public health, without pointing out to you, once more, how many of the other evils that affect the lower classes of our population are connected more or less directly with the want of a sufficiency of pure air and water in the home. * * * Pure air and water, then, are necessary to much more than health and mere physical comfort; they involve in themselves inextricably the first elements of almost all the social virtues, because, where you cannot have cleanliness, you cannot long have either self-respect or respect for others, without which none of the social and practical virtues can get soil, so to speak, to take root. And, accordingly, it is the inevitable consequence of leaving a large population in a permanently impure and unclean state, that habits are created destructive of the social virtues; and in the course of a few generations the very germs of these virtues, the germs of morality and decency, of all the little charities and graces of social life, and, finally, of all the attributes that lift man above the brutes, die out in the infected atmosphere of physical degradation."

The picture which Dr. G. here paints is, as he remarks, a hideous one; it will, nevertheless, be found to delineate, with but very little exaggeration in any one of its features, the actual condition of the lowest classes in some of our great cities. Nor can it be considered a mere hypothetical supposition to refer the origin of all the revolting features depicted to the degrading influence consequent upon a deprivation of the two principles of health—public as well as private—air and water, pure in quality and ample in quantity. Proof conclusive in support of the correctness of the views so ably set forth by the lecturer can be furnished from the annals of the degraded classes of our own cities, but more especially of the cities of Europe, where the supply of air and water is cut off from the poor to a much greater extent than it is with us, as well by their own improvidence as by the desire for gain irrespective of everything else, on the part of a certain, and, unfortunately, too numerous class of property holders. In a later part of his recapitulation, Dr G. uses the following impressive language:—

"Observe, then, the complicated effects of physical impurity, or even the neglect of comfort in the home. Besides the bad effects upon the health directly, it creates a lowered tone of feeling and of personal delicacy: in the worst cases, it almost obliterates the sense of shame, and leads to an indiscriminate and shockingly depraved commerce of the sexes. When the evil falls short of this, it makes the home untidy and wretched, at first, in spite even of the struggle after better things. Then the character of the household deteriorates; the woman gradually loses her feeling of satisfaction in her home; she feels that it is impossible for her to make it, what she ought, an attraction and a pleasure to her husband. Then quarrels occur, and the home becomes unbearable at times; finally, the evil extends to the husband, in a far more pernicious shape still, making him permanently careless and negligent, unfond of his home, unfond of his wife and of his children, and in too many instances fond of some deleterious substitute for the enjoyments of home and the tranquillizing influences of a virtuous family life. It is here, beyond all doubt, I believe, that we must look for the source of much of the drunkenness and other vices of the labouring classes."

This relationship between public and domestic hygiene—with the real comforts which follow its due enforcement—with the improved moral deportment and happiness of the labouring classes, has, heretofore, been too much overlooked. It is well founded, nevertheless, and furnishes an additional and very weighty

argument in favour of a careful study of everything having for its object the promotion to the greatest and widest extent of the public health.

"Need it be said," inquires Dr. G., "that the terrible evils of a disturbed family relation, and a disordered home, tell with fearful force upon the health, the morals, the habits, and the lives of the rising generation, and especially of the very young children? It would be marvellous, indeed, if it were not so. I should not know what to believe. If I found that a disorderly home did not tell upon those exquisitely tender, delicate lives, which, as I showed in a former lecture, are three or four, or five or six, in some cases even ten times, more subject to destruction than are the lives of members of the community at other ages. But we are not left to speculate on this matter. We know, as a fact, that the lives of young infants are not only very fragile, but are actually sacrificed to an enormous extent wherever the home is neglected. In a former part of this course, I showed that the variation in the death-rate of very young infants is not less than enormous, as compared with that of adults; so that while the difference between the healthiest and the most unhealthy district of England, as respects the death-rate of the whole population, is not more than about 15 in 1,000 living, the difference in respect to children under five years is nearly 90 in 1,000, and the difference as to children under one year is, I have reason to believe, more than 200 in 1,000 living. There are, indeed, not a few places in which, counting over large numbers of the population, the children are thus mismanaged: Where the domestic relations of the population, taken as a whole, are so bad that not less than a third, probably indeed much more in some places, of all the children born fall victims to disease, or are in some way or other destroyed before they are even one year old—before their little limbs have learned to walk, or their tongues to speak, and while they yet are, or ought to be, drawing their food from the breasts of their too careless, or perhaps yet more unhappy mothers. I hardly know a fact in the long story of human guilt and misery more deeply impressive than this." * * *

Many more extracts might be made, showing how intimately health and prosperity, and civilization—all things, indeed, which concern the happiness of individuals and communities—are connected; that it is not less the duty than the interest of the community to see that the means of personal and domestic cleanliness, the free use of the commonest and most indispensable of God's gifts, air and water, are brought within the reach of all, and that they are, as far as practicable, properly applied. But we refrain; we at the same time recommend the volume of Dr. G. to the careful study of every one. The author has presented in a plain and forcible manner the important subjects of which he treats, and has adduced a large amount of facts in illustration of their true character and of the correctness and cogency of the arguments by which he has endeavoured to enlist in their behalf the public mind and organized co-operation. It is in the proper sense of the term a popular book for popular use. D. F. C.

Art. XXII.—*The Ambulance Surgeon, or Practical Observations on Gunshot Wounds.* By P. L. Appia, M. D., Fellow of the Royal Society of Naples, &c. Edited by T. W. Nunn, Assistant Surgeon to the Middlesex Hospital, and A. M. Edwards, F. R. S. E., Lecturer on Surgery in the Edinburgh Medical School. Edinburgh, 1862. 12mo. pp. 266.

This volume contains the translation, somewhat condensed, of a French work on gunshot wounds, written by Dr. Appia, together with some additions made by the British editors.

Dr. Appia's work is evidently the production of an accomplished surgeon, of one who has studied the literature of his profession, and who has himself had experience both in hospitals and on the field. It is divided into two parts, the first treating in separate chapters of the nature and varieties, the diagnosis, the prognosis and complications, and the treatment of gunshot wounds, and the second part considers gunshot wounds in the different parts of the body. The

general outline of the treatise is, therefore, the same as that in the favourite work of Professor Longmore, to which, though as a whole it must be considered as inferior, this will be found decidedly superior on the subjects of prognosis and of complications. Of course the tone of the work is altogether different, and, from being less dogmatic, it is more agreeable.

The chapter on *the first dressing of fractures of the limbs* contains, among much other excellent matter, the description of an apparatus for fractures, which appears to enable the wounded man to be transported with remarkable facility under the most disadvantageous circumstances. As it is stated that, after having been tried in the army of Italy, this apparatus was introduced into the military hospitals of Paris and Turin, and into the Spanish army, it is evidently worthy of being made known in this country.

The great peculiarity of this apparatus consists in a number of small splints and vulcanized India-rubber air-cushions, that can be inflated at pleasure, all bound in strong canvass, so that the limb can be entirely surrounded. The apparatus varies in the size and number of the cushions; in the simplest, intended especially for wounds of the knee, the leg, and the foot, there are four cushions, about twenty inches in length and six in breadth, with five narrow splints, with three straps to buckle the apparatus around the limb. For fractures of the thigh and for complicated wounds of the knee, there is a long splint, of very ingenious construction, composed of several pieces, intended to admit of its extension, and yet form as firm support as if they were all one piece of wood. The comprehension of the description of this apparatus is aided in the text by a number of figures. Dr. Appia says experience has proved that by this apparatus the leg is entirely secured from any shocks from without. "One may even sit down upon it violently, when fixed and buckled up, without the leg experiencing anything beyond a slight increase of pressure. All shocks from without spread immediately, by the law of undulations, through all the cushions, and produce only a trifling direct effect."

There is little to be said that is favourable of the manner in which the British editors have performed their task in this volume, whether as translators or as original contributors. As an example of the one the following extract will be sufficient, and the mistake as to the signification of *la rage* will be found amusing:—

"All that reminds us of similar conditions produced by hydrophobia. I have observed a young girl who sunk in a few days after a fright which placed her in a condition between tetanus and passion (rage). She swallowed with difficulty, and only when the drink was brought to her from behind, and in almost total darkness; my arrival, or the sight of any one approaching her, set up tetanic spasms. The post-mortem offered no explanation. To these negative precautions will be added the employment of direct calmatives, especially full doses of opium; Larrey advises its being associated with camphor." (pp. 99–100.)

The original contributions of the editors, which consist of a short article on Disinfectants, and a part—sixty pages in length—on Surgical Appliances, have been added, it is to be hoped, without much reflection. W. F. A.

ART. XXIII.—*Experiments and Observations upon the Circulation in the Snapping Turtle, Chelonura Serpentina, with especial Reference to the Pressure of the Blood in the Arteries and Veins.* By S. WIER MITCHELL, M.D., Lecturer on Physiology. Philadelphia, 1862. 4to. pp. 14.

IN this interesting memoir are detailed the results of a series of experiments instituted with the view of determining in the snapping turtle the force of the heart's contraction, the degree of the arterial and venous blood-pressures, and the influence exerted upon these by inspiration, expiration, and muscular exertion.

The instrument used in these experiments was the hæmometer of Magendie, as modified by Bernard, and described by him in his well-known lectures on the "Liquids of the Organisms."

From observations made upon the pressure of the blood in the carotid arteries of eight snapping turtles, Dr. Mitchell found that the minimum pressure in the artery is about one-third that in the artery of a mammal, or as 33.3 to 110, 103 or 95, according to the animal chosen for comparison.

"The force of the heart-act in the turtle elevates the column, on an average, 11 m. m., which is about the pressure observed in a dog of middle size when tranquil, and when the respirations do not prevent accurate observation of the influence of single pulsations, as is commonly the case.

"The impulse conveyed to the column of blood during the systole of the heart in the turtle is somewhat different from that of the mammal. In place of a sudden and abrupt motion, as seen in these latter animals, the mercury moves so slowly that the time of its rise during a systole may be estimated at one second, the period of fall being one second and one-fifth. The rise of the mercury was usually steady and regular; its fall was broken and irregular, so that after falling two-thirds of the distance rapidly, an equal time was occupied in effecting the remaining third of the total descent. The number of heart-pulsations varied in the eight animals examined from 25 to 40. In the individual cases its number was scarcely altered during the whole observation."

The full and slow expiration which forms the first act of the respiratory process in the turtle exerts no marked effect upon the arterial pressure. The long inspiration which follows usually increases this pressure a little. The short expiration which terminates the respiratory series at once varies the arterial pressure.

"The effect of muscular movement upon the pressure of the blood in the arteries was well marked and interesting. During violent movement the force of the heart remained unaltered, but the whole column of mercury rose, a result which attained to a maximum when the movements were coincident with the long inspiration and the short expiration which terminate each single series of respiratory movements. On such occasions the mercury sometimes rose as high as 70 m. m., and the action of the heart was irregular and unequal in force. Immediately after the movements were over, the mercurial column fell to a much lower point than usual, and then gradually ascended to the normal standard."

We regard this monograph as an interesting addition to the literature of experimental physiology, and we hope that the author will complete the study so well begun, by future more elaborate investigations. J. A. M.

ART. XXIV.—*A Manual of Medical Diagnosis; being an Analysis of the Signs and Symptoms of Disease.* By A. W. BARCLAY, M.D., F. R. C. P., Assistant Physician to St. George's Hospital, &c. &c. Second American, from the second and revised London edition. Philadelphia: Blanchard & Lea, 1862. 8vo. pp. 451.

HAVING fully reviewed this work when it first appeared, a short time since, it is sufficient now to say that the rapidity with which the first edition has been exhausted shows the appreciation in which it is held by the profession.

The very early period, the author states, at which a call has been made for a second edition of this manual has prevented his attempting anything in its revision beyond verbal alterations and minor additions. And he very modestly adds: "While I take this opportunity of expressing my gratitude for the hearty good will with which my effort to supply an acknowledged deficiency has been received, and for the kindly tone of all the criticisms which have reached me, I cannot but feel that it owes its success more to the earnestness of purpose which characterizes the students of the present day than to any merit of its own."

We commend the work to the medical student as affording useful aid in obtaining knowledge in a department of our science, the acquisition of which is essential, that our science may rest on a sure and solid foundation.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *On the Tactile Sensibility of the Hand.*—Dr. Ballard read before the Royal Medical and Chirurgical Society (March 11) a paper, the first of a series, on the tactile sensibility of the surface of the body. The method he has employed for ascertaining the sensibility of the parts examined was that known as Weber's; but inasmuch as the results of this method vary according as the points of the compasses are laid in the direction of the long axis of a part or transversely to it, he employs the sum of the numbers obtained by an observation in each direction as representing the true sensibility of any part. The numbers are given in English inches and decimals. He considers that the hand, being *par excellence* the organ of touch, and possessing on the whole the highest amount of sensibility, and giving thus readily a standard for comparison of subjective impressions made elsewhere, it is important that it should be the organ first examined. The paper is based upon the results of observations made upon 142 points upon the surfaces and borders of the author's own hand and fingers—in all, therefore, of 284 separate observations. It consists mainly of elaborate tables, from which the author deduces in due order the general sensibility of the hand and its surfaces and borders, and separately of the metacarpal portion, fingers, and thumb. He not only compares these several parts between themselves, but points out the relative sensibility of the lateral halves of the hand, these being related to the freer motion imparted to the radial half; and of the centre to the sides, as showing at what parts of the hand the sensibility is highest at any given distance from the wrist. The following are some of the more important deductions: The most sensitive spot of all he finds to be the tip of the index finger, in which he differs from Weber, but agrees with Valentin. The sensibility of this spot is represented by the number .35 in. The spot where he found the lowest sensibility (5.0 in.) was on the dorsum of the hand, opposite the base of the fifth metacarpal bone. The palmar surface of the hand was in all parts more sensitive than the dorsum; but this was not the most sensitive part, for next to the tips of the fingers stood in order the two borders, the radial border being more sensitive than the ulnar. As pointed out by Weber, he also found that the sensibility of the hand increases from the base towards the extremity; but the author exhibits this fact by accurate numbers, and demonstrates not only the increase but also the rate of increase on each surface and border of the hand and of each finger separately. He finds the most rapid increase in sensibility to take place at the spot where the fingers actually commence, not where they apparently commence, and thus not at the clefts, but opposite the metacarpo-phalangeal articulations, and again at the middle of the last phalanges on approaching the tips of the fingers. Perhaps the most interesting and im-

portant demonstration of all is that which relates to the fingers and their several surfaces. On the whole, the most sensitive finger is the index, and the sensitiveness shades off towards the ulnar side of the hand; and the most sensitive portion of the index, next to the tip, he finds to be its radial side. Of the little finger, the most sensitive part is the ulnar side, and he connects these two facts with those parts entering into the constitution of the borders of the hand at large. Of the palmar surfaces of the fingers, that of the index is the most sensitive; of the dorsal surfaces that of the ring finger is the least sensitive. As respects the radial sides of the fingers, he finds the radial side of the index to be the most sensitive, and that the sensibility shades off as the fingers are farther removed from the radial side of the hand, till it becomes least upon the little finger. As respects the ulnar sides, he finds that that of the little finger is the most sensitive, and that the sensibility becomes less as the ulnar side of the hand is distanced; with this remarkable exception, however, that the high sensibility of the index is provided for by its ulnar side standing next in rank to that of the little finger. Of the three intervals between the fingers, that whose approximating surfaces possess the highest sensibility is the interval between the index and middle fingers. The thumb is, for the sake of convenience and simplicity, considered separately, and is regarded, from its carpal attachment onwards, as a finger not having a metacarpal element. It is thus compared in the paper with the fingers, from their metacarpo-phalangeal joints onwards. Appended to the paper are tables exhibiting the observed sensibility in each direction at the several spots examined, and four photographs on which are marked the sums of the observations at each spot. The author reserves the consideration of the differences of result according to the direction in which the compasses are placed for a future communication.—*Med. Times and Gaz.*, March 29, 1862.

2. *Valves of the Veins of the Extremities.*—M. VERNEUIL made the following observation, at the Paris Anatomical Society, on the venous system of the extremities. While some of the arteries are accompanied by only a single vein, others have two venous satellites. The former are the encephalic, pulmonary, cardiac, uterine, and thyroid veins, and those of the portal system. These are all destitute of valves, while the veins of the limbs, which are always double in relation to the artery, are all possessed of valves. Is there here anything beyond a mere coincidence, any relation of cause and effect? Is not the existence of a double vein the consequence of the presence of the valves! When we contemplate the amount of pressure exerted upon the valves by the column of blood, we feel surprised that these folds are enabled to fulfil their office, and that their resistance is not oftener overcome by the obstacle which they have to surmount. But our surprise ceases when we consider that each of the segments of the vein, of the portions comprised between two valves, is provided with what may be termed a safety canal, that is, a vascular tube, which, arising a little above the lower valve, is directed at first horizontally, then vertically, and then again horizontally, so as to enter above the superior valve, presenting towards the superior extremity of its vertical portion a valve so disposed that the blood may in this safety canal flow towards the heart, but not in the contrary direction. Each segment of the vein is provided with a similar canal; and supposing these canals conjoined, they would constitute a single safety-tube, the vertical portions of which represent the second vein attached like the first to the artery, while the horizontal portions represent a transverse anastomoses which establish a constant communication between the two parallel veins. This safety-tube is provided with valves disposed as noted, and which only allow of a concentric movement of the liquid. The second vein thus serves as a derivative for the first, which in its turn plays a similar part for the second. From this reciprocity of action there necessarily results a well nigh complete equality of volume for the two vessels. This explanation applies to all the veins of the extremities, and, in a general manner, to all veins having valves. The femoral vein, which at first sight seems to offer an exception to the rule, nevertheless presents the same disposition, for an attentive examination will demonstrate that there exists by its side a second vessel of smaller dimensions, communicating with the first by numerous anastomoses, each of which always opens into the principal vessel

above a valve.—*Med. Times and Gaz.*, May 10, 1862, from *Bulletin de la Soc. Anat.*, vol. xxxvi.

3. *Marriages of Consanguinity and Deaf-Dumbness.*—M. BOUDIN, so well known for his researches in medical statistical questions, thus concludes an interesting inquiry concerning the effects of marriages of consanguinity: 1. The opinions hitherto delivered, whether for or against the hurtfulness of these marriages, have, for the most part, not been based upon conclusive proofs. 2. It is the statistical method that can alone supply a scientific solution of the problem. 3. It results from my own researches that consanguineous marriages are contracted in France at the rate of 2 per cent.; and that deaf-mutes are the issue of consanguineous marriages in the proportion of 28 per cent. at the Paris Imperial Institution, 25 per cent. at Lyons, and 30 per cent. at Bordeaux. 4. Marriages between nephews and aunts are contracted in France in the proportion of 0.014 per cent. (fourteen thousandths per cent.), while deaf-mutes are the results of such marriages in the proportion of 2.04 per cent.—in other words, deaf-mutes resulting from such marriages are 145 times more numerous than they should be. 5. Marriages between uncles and nieces are contracted in the proportion of 0.04 per cent. (four hundredths), and the deaf-mutes resulting from such marriages reach 1.61 per cent., *i. e.*, the danger of engendering deaf-mutes is 40 times greater in this kind of alliance than it is in ordinary unions. 6. Marriages between cousins german are contracted in the proportion of 0.77 per cent., and deaf-mutes are produced in the proportion of 18.47 per cent., *i. e.* 24 times more frequent than they should be. 7. The proportion of deaf-mutes proceeding from a consanguineous origin would be still greater if we could take into account those which proceed indirectly from consanguineous marriages. 8. While at Berlin the proportion of deaf-mutes is but 6 in 10,000 among the Christians, it is 27 in 10,000 among the Jews. 9. In nearly the whole of the cases, the deaf-mutes issuing from consanguineous marriages have parents who are perfectly healthy and exempt from hereditary affections. 10. When male and female deaf-mutes intermarry, not being consanguineous, the children they produce, with rare exceptions, are exempt from dumbness and deafness. 11. In the face of such facts as these, the hypothesis of a morbid hereditariness, employed for the explanation of the frequency of deaf-dumbness among infants the results of consanguineous marriages, is radically false. 12. The hypothesis of the pretended harmlessness of consanguineous marriages is contradicted by the most evident and well-verified facts, and can only be excused by the difficulty, or rather the impossibility, of giving a physiological explanation of the production of infirm children by parents who are physically irreproachable. M. Boudin, in proof of the practical importance of this kind of inquiries, states that since 1831 more than 15,000 men have been exempted in France from military service on account of deaf-dumbness, dumbness, or deafness.—*Med. Times and Gaz.*, May 10, 1862, from *Receuil de Mém. de Méd. Militaire*, March.

4. *Marriages of Consanguinity and their Influence on Offspring.*—A very interesting and elaborate paper on this subject has been lately read (February 6, 1862) before the Medico-Chirurgical Society of Edinburgh, by Dr. MITCHELL, of which the following is an abstract:—

Dr. Mitchell began by a brief account of existing opinions on this subject. He pointed out that whatever the practice may be, such alliances are, and have always been, almost universally condemned both by the general public and the medical profession. And as every one has considerable opportunities of testing its accuracy by personal observation, he argued that the probability of its being a traditional error becomes very small. He stated that the literature of this subject abounded in simple assertion, which might be correct, but that the basis on which important conclusions are made to rest is often not given at all, and when given, is undefined or clearly too narrow. He pointed out that much of the general and professional opinion on this subject hangs on a peculiar kind of evidence. We are presented with the question, "Do these marriages injure the offspring?" and we search for instances from the history of which the answer is to be given. Now it is certain that all those cases which have been marked by

misfortune will first rise up, while many of those which have exhibited no evil effect or no peculiarity will probably be passed over because forgotten. Facts so collected lead to inferences beyond the truth—an exaggeration of a calamity whose proper dimensions are sufficiently great. Without intention they are selected cases. Being true in themselves, they show what is possible, but they by no means embody the rule. He then detailed the results of 45 cases so collected by himself. Some of these he discussed individually as illustrative of atavism, of the connection between heredity and his subject, of the various forms of injury and modes of manifestation, etc. The line of investigation to which these considerations had led was then described. Instead of grouping cases, supplied by his own memory or the memory of others, he took small communities, examined the history of every such alliance in these communities, as well as of every marriage without kinship, and compared these. And in order further to test the result of such inquiries, he ascertained, with as much accuracy and precision as possible, the history of the parentage of all insane or idiotic persons in a particular district of the country. These inquiries were conducted by himself, his official duties giving him the necessary opportunities. In addition to showing the influence of consanguinity of parentage on the production of the actual idiocy of the country, he also showed its power as a cause of actual deaf-mutism. And he examined at some length the argument from in-and-in breeding in the lower animals. By this mode of investigation he hoped to obtain sounder conclusions as to the character and measure of the pernicious influence which blood alliances exercise on the offspring.

Taking the whole number of idiots examined (711), out of every eight one was the fruit of a union of consanguinity. This includes those cases where the relationship of the parents could not be ascertained, as well as illegitimates. When these were excluded, and when those idiots *born in marriage* of parents related by blood were compared with those *born in marriage* of parents not so related, they stood in the proportion of 1 to 5.8—or more than every sixth idiot born in wedlock was found to be the child of cousins. It further appeared that the influence of kinship of parentage as a cause of idiocy manifested itself still more strongly when those cases only were dealt with in which more than one idiot had occurred in a family.

As regards the deaf-mute the influence was not so marked, but was still very evident. In Great Britain one deaf-mute in 16.7 was found to be the child of cousins. This closely agrees with Mr. Wilde's estimate for Ireland, but is not so high as that formed by Dr. Peat and Mr. Buxton.

These subjects, which were discussed at considerable length, are here stated in the briefest manner possible; but when the paper is published the whole details will be laid before the profession.

Dr. Mitchell, in examining the argument from in-and-in breeding in the lower animals, discussed the views on this subject expressed by well-known writers and stock-breeders, and concluded with the following remarks:—

"Everything is secondary to the property of producing in the shortest time the largest quantity of flesh with the least consumption of food. The great desideratum is an early arrival at maturity, or premature age—an early maturity, too, of particular parts, of muscle and fat especially.

"After all, then, in these cases where in-and-in breeding has been practised with so-called good results, the issue is nothing but the development of a saleable defect, which, from the animal's point of view, must be regarded as wholly unnatural and artificial, and not calculated to promote its well-being, enjoyment, or natural usefulness. And in this view all the seeming contradictions to the law disappear. By in-and-in breeding we may establish an artificial type, and fix a peculiarity which is unnatural, if not morbid, and whose only value is its profitable convertibility into gold, but no evidence whatever exists in these apparent anomalies that by such a system of breeding we can improve the natural animal.

"Strictly viewed, Collin's '*Comet*' was nothing more or less than a perfect pathological specimen—a deviation from a natural animal—perfect in a desired direction. Yet, *pro tanto*, the animal was the less useful to himself, *had he been*

left to himself, and had he been deprived of the artificial keeping and management which his artificial condition demanded.

"When it became desirable to perpetuate a peculiar malformation in man, then in-and-in breeding may have *good* results—the results being estimated as good or bad according as they realize the end in view. I know the case of a man who has supernumerary little fingers, and whose two children and seven grandchildren have the same. Were additional little fingers of great value, the true way to obtain a race having this peculiarity, would certainly be to establish blood alliances in this family; and when we obtained the desired excess of fingers in the offspring, we should then have as good reason to say that kinship of parentage had done good and not harm (since we should have in the way we wanted a more perfect animal)—as the farmer has to say, it has done no harm but good, when he looks on his Leicester sheep, with little heads and small bones—their lymphatic temperaments enabling them to feed without disturbance—fat, ripe, and ready for sale in their very lambhood.

"Till the excellences of man are estimated by weight; till the man be an artificial, and not a natural man; till we want legs at the expense of arms, or arms at the expense of legs, or head at the expense of body, or body at the expense of head; till we want maturity in babyhood and premature age; till the perfect man be something else than a well-balanced development of all his components, bodily and mental, we must apply the experience of breeders of artificial stock cautiously and with reservation in human physiology."

That part of the communication which related to the examination of particular communities embraced several fishing villages on the N. E. and S. E. coast of Scotland, as well as St. Kilda, Bernera, and other islands off the N. W. coast. The account of this investigation was full and minute, and the aspects of the question thus brought under notice were very varied. The nature of some of these will be gathered from the conclusions to which Dr. Mitchell has been led, and which are stated below. Many apparent exceptions were pointed out, and attention was directed to those things by which the effects are influenced or modified. The general teaching of the whole, however, decidedly pointed to injury to the offspring as the result of a blood-relationship between the parents. It is not possible to give here even an abstract of this portion of Dr. Mitchell's paper. Each place selected for investigation differed widely from the others, and by peculiarities so decidedly affecting the results, that nothing short of a full detail would be satisfactory. The extraordinary influence of trismus on the infant population of St. Kilda, for instance, appeared to destroy the lesson which it was expected to teach. One pleasing conclusion to which these investigations led was, that such marriages are not so frequent in Scotland as has been long supposed; and it was stated that the enlightened proprietor of the Lewis does all he can to prevent their occurrence among his tenantry.

Dr. Mitchell's conclusions were of two kinds—those resting on a basis of stated facts, and those arrived at insensibly and irresistibly by himself during the progress of inquiry, and founded on observations which it would be difficult if not impossible to tabulate, or even state with precision. These inferences may be thus briefly given, but each in its enunciation was considerably amplified by the author.

I. That it is a law of nature that the offspring is injured by consanguinity in the parentage.

II. That this injury assumes various forms.

III. That in all classes and conditions of society its manifestations are not alike.

IV. That the evil appears to be in some measure under control.

V. That isolated cases or groups of cases may present themselves where, in addition to consanguinity, all the other circumstances are so unfavourable that a confident prediction of much evil would be justified, yet where no such evil appears.

VI. That, where the children seem to escape, the injury may show itself in the grandchildren; so that the defect may be potential when it is not actual.

VII. That, as regards mental disease, unions between blood relations influence idiocy and imbecility more than they do the other forms of insanity.

VIII. That, with reference to Scotland, it may with safety be estimated that about 9 or 10 per cent. of existing idiocy is referable directly to consanguine marriages. In forming this estimate the proper deductions were liberally made, so as to avoid an over-statement.

Dr. Mitchell concluded by an attempt to explain the manner in which these sad effects result from such unions. *Transmissible peculiarities* of all kinds are apt to be thus intensified. If there are diseases in the parents, there are aggravated diseases in the offspring; but though the diseases may not be manifest in the parents, they may be so increased as to constitute evident disease in the children.—*Edinb. Med. Journ.*, March, 1862.

MATERIA MEDICA AND PHARMACY.

5. *Action of Alcohol as an Aliment in Disease.*—Dr. F. E. ANSTIE, Assistant Physician to the Westminster Hospital, relates (*London Medical Review*, April, 1862) four cases, one of pericarditis, two of pneumonia, and one of pleurisy, illustrative of the action of alcohol as an aliment in disease. These cases, he states, "are by no means the only ones which I could quote from my own practice, which might serve to throw light on the question whether alcohol does or does not act as a food. I have selected them, because they are the only cases of which I possess notes in which a crucial experiment was performed, viz., the administration of no food (for none other could be retained on the stomach) but alcohol, in the shape of wine or spirit, mixed with a little water. I think my readers must allow that there is no imperfection in the conditions of the experiments which is at all important; and if this be so, the evidence which they afford is very important. It may be briefly summed up thus:—

"1. Alcohol is capable of sustaining life, in the absence of all other foods, for many days.

"2. During acute diseases, alcohol is sufficient, without the help of any other food, to prevent emaciation of the body, and also the extreme lowering of muscular strength, which would render the period of convalescence tedious.

"3. Given in acute disease no amount of alcohol which the exigencies of the case require will cause inebriation: on the contrary, delirium, unless it depend on inflammation of the brain, may be always checked by the administration of alcohol.

"4. That the demand of the system for alcohol in acute disease is in inverse ratio to the power of assimilating other foods.

"To these conclusions I may add some others, to which I am led, not by the above cases only, but by a very large number of others also.

"1. It is not true that alcohol may only be given with advantage, in acute disease, when the skin is already moist and perspiring. On the contrary, nothing has been more common in my experience than to see patients whose skin had previously been dry and burning hot, break out into a refreshing sweat after some hours of steady perseverance in the administration of alcohol in two drachm doses every half hour.

"2. It is not true that the treatment of acute disease by large doses of alcohol involves any danger whatever of laying the foundation of habits of drunkenness. If the alcohol has been judiciously administered, in sufficient quantities, and yet not too large, the moment that the appetite for ordinary food returns the desire for the temporary substitute will cease. I fully agree with the important remarks recently made on this subject by Dr. Druitt. It may be laid down as a rule that, both in disease and in health, the taking of so large a quantity of alcohol as, under the circumstances, is sufficient to produce intoxication, tends to produce a craving for the stimulus; and it is equally certain that the timid and inadequate use of stimulants in acute diseases tends to produce a similar *bulimia*. But the taking of even a bottle or two bottles of brandy a day, when the case requires it, does not engender the smallest taste for alcohol after the return of

health. And the daily use, during health, of a quantity of alcohol which is insufficient to produce any, even the earliest, symptoms of inebriation, does not occasion the smallest craving for an increase of the dose."

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6. *Therapeutic Properties of the Peroxide of Hydrogen.*—In our number for January, 1861, p. 249, we noticed the interesting researches of Dr. Richardson relative to the therapeutic properties of the peroxide of hydrogen. Since then Dr. Richardson has been pursuing his investigations, and in a paper recently communicated to the Medical Society of London, he has given the results at which he has arrived.

After repeated and long-continued experiments in reference to the different processes for making the solution of the peroxide of hydrogen, Dr. R. has ultimately come to the conclusion that no plan is so good as the one invented by Thénard, in which the peroxide of barium is used as the agent for supplying the oxygen, with hydrochloric acid as the displacing body. The strength of the solution was next discussed, and it was shown that a solution charged with ten volumes of oxygen was the best and most applicable. The dose of this solution for an adult was from one drachm to half an ounce in a liberal quantity of water. The compatibility of the peroxide solution with other medicines was next considered, and it was intimated that, as a general rule, the solution should be given separately, or, if mixed with another remedy, should be so admixed at the period of administration.

From the narration of these particulars Dr. Richardson passed in review the results of his experience in disease. He had used the remedy now in 223 instances, viz., in simple diabetes, 3; in diabetes complicated with phthisis, 2; in chronic rheumatism, 1; in subacute rheumatism, the continuation of an acute attack, 2; in mitral disease with great pulmonary congestion, 4; in irregularity of the heart, with cardiac apnœa, 3; in struma, with enlargement of the cervical glands, 2; in struma, with formation of purulent matter constantly recurring, 1; in mesenteric disease, 1; in simple jaundice, 1; in jaundice complicated with cardiac and hepatic disease and ascites, 1; in cancer affecting the glands of the neck, 1; in pertussis, 9; in chronic bronchitis, 9; in bronchitis complicated with mesenteric disease, 1; in chronic laryngitis, 3; in anæmia, 44; in phthisis, first stage, 66; phthisis, in the second stage, 31; phthisis, in the third stage, 13; in phthisis, first stage, complicated with bronchial disease, 6; in phthisis, second stage, with bronchial disease, 3; phthisis, with valvular disease of the heart, 2; and also in a few cases of dyspepsia.

Analyzing these cases, the author came to the following conclusions: That in the treatment of diabetes, the peroxide, while it reduced the specific gravity of the renal secretion, increased the quantity; so that its value in this disease was inappreciable. In chronic and subacute rheumatism it was of great value. In valvular disease of the heart, attended with pulmonary congestion, it largely relieved the attendant apnœa. In struma it removed glandular swelling, like iodine. In mesenteric disease it improved the digestion, and favoured the tolerance of cod-liver oil and iron. In jaundice it exercised an excellent effect, by improving the digestion and causing a free secretion. In cancer it seemed to exert no influence. In pertussis its value was very remarkable; it cut short the paroxysms, and removed the disorder altogether, quicker than any other remedy, except change of air. In old-standing bronchitis, during attacks of suffocative dyspnœa, it afforded rapid relief. In chronic laryngitis, its caustic character rendered its administration painful. In anæmia, while it exerted no specific influence *per se*, yet combined with iron it increased the activity of that drug. In phthisis pulmonalis, in the first stages, it greatly improved digestion and increased the activity of iron; while in the last stages it afforded unquestionable and wonderful relief to the breathlessness and oppression—acting, in fact, like an opiate, without narcotism.

After describing the use of the peroxide in dyspnœa and epilepsy, the author dwelt finally on the anomalous symptoms excited by the solution; pointing out the singular fact that in some instances where it had been pushed freely it had produced profuse salivation. That chlorine and iodine had in these effects an

analogy to salts of mercury was a fact long recognized; but that oxygen in the active state exerted the same physiological action was a fact as remarkable as it was interesting. It opened an entirely new field of inquiry. It suggested the possibility that the salts of mercury did not act by virtue of the mercury as mercury at all, but by the agency of the oxygen, chlorine, or iodine which they conveyed into the organism. It suggested also the propriety of ascertaining whether chlorine or peroxide of hydrogen might not replace mercury in cases where it was supposed to be a specific. If this suggestion were carried out and an affirmative were supplied, the method of cure in the disorders specified would be rendered much more simple and rational.—*Lancet*, April 12, 1862.

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7. *Podophyllin.*—Dr. GARDNER states (*Lancet*, March 15, 1862), that "from 1856 to the present I have constantly employed podophyllin in my practice, and the result of my experience is as follows:—

"1. I know no other substance which so certainly produces bilious evacuations when the liver is full of bile; I do not even except calomel; a full dose—namely, two grains (when pure)—producing effects very similar to those resulting from ten grains of calomel. I have seen jaundice, where the stools exhibited no trace of bile and the skin and eyes were of a deep yellow, cured by a single dose, incredible quantities of bile being evacuated. With respect to this action of podophyllin, I think I am warranted in asserting, strange as it may appear, that if, after a free evacuation of bile, a second dose of two grains is given within two or three days, it produces no effect whatever, not even purging. This certainly happens in ordinary engorgement of the liver, if not in jaundice. The purgative effect in nearly all cases is not direct—that is, it does not act on the bowels for ten or twelve, or even in some cases sixteen or twenty hours; the purging appears to result from the large amount of bile thrown into the bowels. Sometimes its action is without uneasiness, but generally there is a sense of tormina or twisting and spasmodic action in the upper region of the abdomen and about the navel.

"2. In the torpid liver of persons who have resided in tropical climates, a dose of one grain seldom if ever fails to rouse the secretory action of the organ and bring bilious coloured stools; but it often requires twenty-four to thirty-six hours to act on these patients. It is only at long intervals that the dose requires to be repeated. These patients are, as is well known, accustomed to take blue-pill, and often suffer much from nervous irritability, ulcerations of the mouth, diarrhœa or costiveness, or both alternately, depression of spirits, and many other evils, which all pass away after a dose of podophyllin.

"3. In the constipation which often besets patients in phthisis—as, I think, most frequently from fatty liver—the podophyllin is the best aperient I have found, though, for the above reasons, very long in acting on the bowels. I have given it in all stages of this disease with marked benefit, not obtainable from any other purgative.

"4. I have given it much in gout, deeming it an important point of treatment to secure free biliary evacuations, which it invariably does; but I have not trusted to it alone, as I think might be safely done; and the same in acute rheumatism. My mode of giving podophyllin has been to make it into a small pill with soft extract of henbane, or one-eighth of a grain of extract of belladonna, or more frequently with another concentrated vegetable resinoid—to be described in a future paper—leptandin, either of which moderates the tendency to harshness of the podophyllin.

"5. In constipation without other disorder, I usually give one-sixth to one-fourth of a grain in a pill of compound rhubarb-pill. It acts thus very much the same as we expect a grain of calomel or five grains of blue-pill with the compound rhubarb-pill to act; and I consider that it may in very numerous cases be substituted for mercurials with great advantage.

"6. Whenever I have deemed it desirable to evacuate or stimulate the liver, as in bronchitis, fevers, headaches, &c., I have used this medicine with highly satisfactory results.

"7. Aware of the eulogiums which have been bestowed on podophyllin as an alterative, anti-syphilitic, &c., I cannot either contradict or confirm them from

my own observations; but I have met with two or three cases where it unequivocally produced ptyalism.

"Lastly. On my recommendation it has been introduced to the Jewish Hospital at Jerusalem, where liver disorders abound, and I have the general report that it is found to justify the most sanguine expectations of its remedial value; and I may add, from many of my friends who have employed podophyllin, I have received opinions confirmatory of my views."

We have been also favoured with the following:—

"Dr. Ward has administered podophyllin during the past year at the Seamen's Hospital, Dreadnought, and in private practice in a considerable number of cases. The affections in which he has found it useful are cardiac, renal, and hepatic dropsies, an asthenic form of dropsy frequent amongst sailors, and not associated with organic disease; congested and indolent liver. He has given it in doses of half a grain or a grain. Its action has been slow, ten or twelve hours having usually elapsed before it has effected evacuation of the bowels. In the majority of cases it has not occasioned discomfort in the way of nausea, griping, or depression. It is less hydragogue than elaterium, but never fails in its cholagogue action; producing copious bilious stools, semi-solid at first, subsequently watery. In two other cases, Dr. Ward has found it to linger for a considerable period in the bowels, and cause much griping and irritation; but these results might be obviated by quickening its action by combination with some other drug. Dr. Ansell informs Dr. Ward that he has given podophyllin in doses of a quarter of a grain twice a day in cases of amenorrhœa with constipation, and has found it act as a powerful cholagogue cathartic and emmenagogue. The drug may certainly be regarded as a valuable addition to our materia medica."

Dr. Ramskill, Physician to the London and Epileptic Hospitals, has favoured us with the following valuable remarks and cases. It will be observed that his experience of the effects of podophyllin is remarkably confirmatory of the opinions of the American physicians:—

"Podophyllin may be given alone, but it is apt to gripe. At the London Hospital I invariably order a pill of equal parts of podophyllin and extract of Indian hemp. It is then slower of action than when given with hyoscyamus or conium, but less frequently gripes. At the Epileptic Hospital I have not for more than a year used any other pill as a purgative for epileptic patients, except under special circumstances. The formula I use is extract of belladonna and podophyllin, of each one-fourth of a grain, made into a pill with extract of minespermium fenestratum.[1] The latter drug is rich in berberine, and is used as a tonic adjuvant. Belladonna has itself a laxative tendency; but it is not used for that property. One or two such pills are usually sufficient, if continued for two or more successive nights.

"The cholagogue action of podophyllin is not confined merely to the period of its administration; large quantities of bile will continue to flow for several days after ceasing its employment.

"Latterly, at the London Hospital, I have administered podophyllin in about fifty cases a week. In three cases only has its action been seriously complained of, the complaint being its excessive action, with pain. The dose was, in fact, too large—namely, half a grain, all the three patients being women. Except under such circumstances, the evacuations from podophyllin are rarely watery; they are always fecal at first, followed by the peasoup-like evacuations we see follow from the continued use of colchicum, but of a brighter colour. With regard to the colour of feces generally, I must say that a brown colour does not, in my opinion, prove the presence of bile, for the dark epithelium thrown off in the colon may cause this; neither does a pale clayey series prove that the liver does not secrete bile, for this may be limited in quantity and absorbed for well known uses in the economy. (Liebig.) But a quart or more of a golden-yellow fluid, yielding the usual reactions to bile-tests, will often follow the use, and demonstrate the cholagogue power, of the drug.

"Podophyllin seems to me to rank near scammony as a purgative, but it

[1] We shall give an account of this plant in a future paper.

is milder in its action. As a cholagogue it stands pre-eminent and alone—far before mercury or any other drug that I have ever administered. I am almost tempted to say, that there is no real cholagogue known in medicine except podophyllin. Will calomel or blue-pill procure in any case an unequivocal discharge of bile apart from its purgative or laxative action—*i. e.*, apart from its derivative influence, accompanied by increased secretion of the small and large intestines? Is not this the mode in which the biliary secretion is liberated by these mercurials? Podophyllin, on the contrary, in very small doses, will procure an abundant flow of bile, and often induce its discharge by vomiting, before, or even sometimes without, any purging. My idea respecting the *modus operandi* of mercurials is supported by very good authority—(*vide* Morehead, *On the Diseases of India*)."

8. *Therapeutical Properties of Malt.*—M. FRÉMY has made use of malt as a remedial agent. That prepared by Nitsohke, a brewer near Berlin, he has found to be of superior quality to that obtainable at Paris; it is more soluble, aromatic, and agreeable. The malt-powder may be given internally in the form of decoction, and applied externally by means of baths. The substance was tried on sixty-four subjects of well-marked phthisis; but the results were trifling, beyond a certain degree of temporary amelioration. It was, however, of greater service in cases of chronic bronchitis, early phthisis, and chronic pulmonary catarrh—its utility being very marked in this last affection. In simple dyspepsia it is of use when the saburral condition of the tongue has been removed. In Germany it has been found to be of great advantage in the chloro-anæmia of nurses. "The powder is a true analeptic, and the bitter principle, which it owes to the presence of lupulin, renders it very efficacious in re-establishing the functions of the stomach in dyspepsia."—*Med. Times and Gaz.*, March 15, 1862, from *Journ. de Chimie Méd.*, Feb.

9. *Substitution of Daturia for Atropia.*—For some time past M. JOBERT has substituted for the preparations of belladonna a solution of daturia as a mydriatic. He finds it is three times more powerful than atropia, and can therefore be employed in proportionally less quantities. It does not produce pain when introduced into the eye, nor does it confuse vision like belladonna, while its effects are more constant and its action more persistent.—*Bull. de Thérap.*

10. *Antiseptic Properties of Ammonia.*—Dr. RICHARDSON, in a paper read before the Medical Society of London, states that his earliest researches were directed to the study of the antiseptic properties of gases, and recalled attention to the communication he had made to the Society on this subject in 1850. His present inquiry and application of ammonia as an antiseptic commenced in 1858. His attention was then directed to the fact, that the presence of ammonia effectually arrested the oxidation of various bodies, and even prevented the action of ozone. Believing that by an extension of the same law animal substances exposed to ammonia could be prevented from putrefaction, he kept blood and portions of tissues in contact with simple ammoniacal vapour, and with results which were most remarkable. Blood in an ordinary stopped bottle, if charged with ammonia so as to give a faint ammoniacal odour, would retain its freshness and many of its properties for years. Animal structures in like manner placed even so as to be massed together in bottles containing ammonia vapour, would retain their freshness for an unlimited time. Dr. Richardson now showed the following specimens: The lungs of a calf which he had used for lecture purposes for six months, and which had been simply placed under a bell-jar, a little ammonia in solution being put over them from time to time; a pancreas which had been kept for eighteen months in a bottle containing twenty minims of ammonia solution; a kidney showing deep congestion, which had been removed sixteen weeks; a bottle of mixed specimens, including portions of intestine with enlarged glands; a bladder, the inner surface of which was injected; a uterus and ovaries and a pancreas, all of which had been preserved lying close in one bottle for sixteen weeks; also a portion of liver, which had been removed nearly

three years; and a cancerous breast, which had been removed by Mr. Spencer Wells eight weeks before. The specimens all retain their freshness, and admitted of dissection and examination as in the recent state. The author then described the method of applying ammonia. It was necessary, in the first place, to trust to the ammonia alone: specimens that were exposed first to spirit and then to ammonia vapour were always spoiled. For the preservation of fluids, such as blood or milk, it was merely necessary to add the alkali in solution in proportion, say of twenty minims, of the strong solution to two ounces of the fluid to be preserved. For tissues the plan was to place the specimen to be preserved in a stoppered bottle or under a bell jar, such as is used for wax flowers and ornaments, to place in the jar with the specimen a layer of felt or lint, charged with from ten minims to a drachm of the liquor ammonia fortis, and then to close the vessel or jar secure from the external air. For a luting in such cases soap answered best, or a mixture of soap and red lead. After this description, Dr. Richardson pointed out the practical value of the method. 1st. In conducting post-mortem inquiries it did away with all occasion for hurry. It was now only necessary at an autopsy to be provided with one or more jars, each containing say a drachm of liquid ammonia. The jars might now be filled with specimens, and if the stoppers were put in with care the specimens would retain their freshness for weeks, and even their microscopical characters. The only peculiar change was, that if much fat were present, the alkali formed with it a kind of soap; a fact which explained the formation of adipocire in the dead subject undergoing slow decomposition. For forensic purposes this method of preserving animal structure was perfect, inasmuch as it added no mineral or poisonous matter, and yet secured the part to be examined free from change and from all offensive odour. Not only so, but important pathological changes, such as ulceration of intestine, could be kept under observation and submitted to any number of pathologists. He (Dr. Richardson) had found the system a very useful one, too, for lecture purposes, as it enabled him to show to his class real specimens of disease, such, for instance, as the scirrhous breast now going round, instead of casts or specimens softened, discoloured, and, indeed destroyed altogether by immersion in spirit. The last point to which Dr. Richardson drew attention had reference to the cause of the antiseptic power of ammonia. Ammonia being a product of decomposition had been looked on commonly as a substance provoking decomposition. But ammonia was truly the most powerful antiseptic known: it acted catalytically by preventing the union of oxygen with oxidizable bodies. An experiment was here performed illustrating this: half a grain of ammonia diffused through 40 cubic inches of air was shown to possess the power of entirely suspending the combination of oxygen with potassium on a surface of paper saturated with iodide of potassium, starch, and solution of oxygen, so long as the paper was presented to the ammoniated air; but so soon as the paper was removed, the evidence of the combination, indicated by the formation of the blue iodide of starch, was presented. In preserving animal structures in ammonia, the same experiment was virtually carried out; the presence of the ammonia suspended the oxidation. There were other agents which effected the purpose, such as chloroform; but the fact that these agents were indifferently soluble in water rendered them much less effective as compared with ammonia, which combined readily with the water contained in the tissues, and so perfected the preservation to the minutest point. In conclusion, the results presented tended to throw a light on the influence of the ammonias as the producing causes of some diseases, and as the curative remedies in other diseases. The same rule that pertained to dead pertained to living organic matter. Hence long exposure to ammoniacal vapour, by arresting oxidation, produced extreme anæmia and a low depraved condition of the system, altogether with reduced respiration, reduced appetite, reduced muscular power, and reduced energy. On the other hand, in cases where a rapid oxidation of the body was being determined attended with increase of heat and rapid disintegration of tissue, the administration of ammonia, by arresting these changes, became in judicious hands the most powerful and effective of remedies. It checked decomposition by its action on oxygen; it held the blood fluid by its solvent

power as an alkali, and being volatile it inflicted no immediate injuries on the structures of the body.—*Med. Times and Gazette*, May 10, 1862.

11. *Inhalation of Pulverized Fluids.*—M. POGGIALE recently read to the Academy of Medicine an extremely elaborate report on the much disputed questions connected with the inhalation of pulverized fluids. The various papers on the subject were so conflicting, their contradictions were so glaring, that it became an imperative duty for the Academy to ascertain with precision the amount of practical utility of this new method of therapeutic ministration. M. Poggiale began by establishing the fact that the authors who have inquired into the subject cannot agree as to the penetration of the pulverized fluids into the respiratory passages, and are at utter variance with each other, with regard to the refrigeration of the liquids operated on, the waste of the mineralizing ingredients of pulverized sulphurous water, and the medicinal effects of M. Sales-Girons' method; he then carefully examined in succession all the elements of these intricate problems, and concluded as follows:—

The experiments on animals and on the human subject, instituted by MM. Moura-Bourouillou, Tavernier, and Démarquay, the researches of M. Fournié, "On the Introduction of Pulverized Substances into the Air-passages," demonstrate, beyond contradiction, that liquids reduced to spray actually penetrate into the respiratory ducts.

On leaving the apparatus, pulverized fluids undoubtedly undergo some degree of refrigeration; but, in a letter to the academy, M. Tempier states that this unfavourable circumstance may be neutralized by causing the spray to be emitted in an atmosphere saturated with steam, at a temperature higher than that of the pulverized water.

With regard to the chemical changes induced by the method in sulphurous waters, M. Poggiale, while admitting their existence as a general fact, asserts that they are not the same for all waters of this kind. Thus, the waters of Enghien, which contain free hydrosulphuric acid, lose on an averege 60 per cent. of that ingredient. The waters of the Pyrenees, on the contrary, in which sulphuret of sodium is to be found, are very slightly modified in the process in question. It would also appear that the waste of the sulphurous element is less considerable with M. Sales-Girons' apparatus than with M. Mathieu's instrument.

The desulphuration is, in all cases, greater in proportion as the procedure is carried on at a more considerable distance from the spa, and the changes are, therefore, more obvious in the inhalation-rooms than when portable instruments are used.

Another highly important question requires an answer. Is it possible, with the data in our possession, to describe with precision the therapeutic effects of the inhalation of pulverized fluids? To this query the commission experienced much difficulty in framing a reply; thus, on the one hand, MM. Sales-Girons, Auphan, and Démarquay, assert that they have derived much benefit from the inhalation in chronic affections of the respiratory organs, and on the other hand Professor Champouillon and MM. de Piétra-Santa, Brian, Delore, and Fournié, utterly deny the efficacy of the method. M. Poggiale confined himself, therefore, with undisguised regret, to an appeal to further inquiry, and moved that the thanks of the Academy be forwarded to the experimentalists above named, who have spared no efforts to dispel the clouds which obscure the question.—*Journ. Pract. Med. and Surgery*, also *Gazette Hebdom.*, 10 Jan. 1852.

12. *Administration of Cod-Liver and other Oils.*—Dr. ALEXANDER WALLACE, Physician to the Metropolitan Free Hospital, has instituted a number of experiments with a view of determining the best formula for the administration of oleaginous substances. Starting with the proposition that the digestibility of these substances depends, 1st, on their dilution; and 2d, on their minute subdivision in a convenient menstruum, he tried various admixtures; and recommends as the best equal parts of liquor calcis and oleum morrhuæ. These, he says, when well shaken together, do not subsequently separate readily, but remain in the form of an emulsion, thick and of a milky hue.

"Here," says Dr. W., "in addition to the tonic and sedative action of the liq. calcis (in itself so well suited to the many forms of disease in which cod-liver oil is recommended), a white-coloured, light, very palatable medicine is obtained (perhaps somewhat less disagreeable in its odour than the pure form, owing to the deodorizing action of the liq. calcis), easily rolling over the palate, and, when taken with a little sherry or orange wine, almost devoid of the oily taste, and combining, perhaps in the highest degree of all formulæ that I have as yet tested, the advantages of the mode of administration which I now advocate.

"The addition of a few drops of Condy's fluid to the mixture of liq. calcis and ol. morrhuæ, sufficient only to render it of a greenish-yellow tint, rendered it a little less odorous, and, perhaps, more palatable. I am unable to say whether such addition would ozonize the oil, and thus render it more beneficial. The advantages gained by the mode of administration in other menstrua are:—

"1. The minute subdivision into globules, rendering it thereby more palatable, easily swallowed, and less likely to adhere to the mouth and fauces.

"2. A saving to the stomach of the labour of disintegrating and minutely subdividing the oil, similar to that effected by the teeth in the trituration of solids, both ingesta being thus rendered easy of digestion and assimilation.

"3. The admixture of air-bubbles with the food is believed by many physiologists to assist digestion; this occurs to a very great extent during the shaking of the medicine, which should always be performed in a separate bottle at least twice as capacious as the dose, previous to its being taken.

"4. It may be possible that the friction of the globules during the shaking may develop a portion of electricity in them, giving thereby a tonic character; but this I leave to electrologists to determine.

"The microscopic characters of the mixture of liq. calcis and ol. morrhuæ, recently shaken together, are as follows: Oleaginous globules in a minute state of subdivision, pellucid, of a pale violet tint, many of them as small as milk globules, but many of larger size, having but little tendency to run together into larger globules, with numerous air-bubbles intermixed."—*Med. Times and Gaz.*, April 19, 1862.

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13. *New Preparation from Chloroform.*—Dr. Thomas Skinner, of Liverpool, calls attention to two physical properties possessed by chloroform, viz: 1. Its solubility in alcohol, and subsequent miscibility in water. 2. Its miscibility, if not its solubility, in water.

Lately, while engaged experimenting in order to ascertain the probable composition of Davenport's chlorodyne, Dr. S. accidentally discovered the following valuable facts:—

"1. If chloroform be dissolved in rectified spirit of wine, of specific gravity .838, at 60° Fahr. (L.P.), in the proportion of from one to sixteen minims of chloroform in a fluidounce, the resulting liquid is entirely and freely miscible with water in all proportions. On adding minim by minim of chloroform to the measure of thirty or thirty-two minims to the ounce of the mixture, the solution ceases to be miscible with water in any proportion; the chloroform spontaneously precipitating in small globules, which ultimately coalesce.

"2. If chloroform be added to distilled or any good drinking water, in the proportion of half a fluidrachm to a pint (twenty fluidounces), and briskly agitated, the resulting liquid is perfectly clear and bright, and no globules of chloroform are precipitated, nor can any be detected with the microscope by a power equal to 250 diameters. On adding more chloroform *gradatim*, the point of saturation is not arrived at until the proportions are a fluidrachm to a pint of water. Sixty-four minims to the pint render the mixture quite opalescent, and much of the chloroform is precipitated. At the point of saturation, a drop of any essential oil shaken with the mixture will determine the separation of the chloroform. If the whole fluidrachm of chloroform be added *at once* to a pint of water, and shaken, the resulting liquid will not be so clear as when it is added gradually.

"Bearing these interesting facts in mind, I resolved to put them to some practical use; and I beg to suggest the propriety of there being two new officinal

preparations of chloroform, the names and formulæ for which shall be as follows—

"*Spiritus Formyli Terchloridi* (commonly called chloric ether): Chloroform, ℥v; rectified spirit of wine, sp. gr. .838 (L. P.), Oj. Mix. Dose, ʒss to ʒij.

"*Mistura Formyli Terchloridi* (or chloroform julep): Chloroform, ʒss; pure water Oj. Mix thoroughly with brisk agitation, for a minute or two, in a vessel capable of containing double the quantity. Dose, ℥ss to ℥ij.

"Either preparation may be prepared from the methylated chloroform; but hitherto I have preferred the unmethylated for administration by the *prima via*. A chemical nomenclature has been chosen, in deference to the possible and not improbable fears of the patient."—*Dublin Med. Press*, May 21, from *Brit. Med. Journ.*

14. *Vesicating Collodion.*—Mr. C. R. C. TICHBORNE remarks (*Pharmaceutical Journal*) that "amongst the many epispastics which have been introduced from time to time, cantharides has remained pre-eminent—its certainty, and comparative freedom from pain, being its special commenders. As direct and prolonged contact with the skin is necessary to produce a vesicle, many substances have been in use as an excipient for the application of the vesicant. Some of the preparations in use at present are fluid, whilst others are applied in the form of plaster or ointment. In the first instance, if the desired effect is not produced *instanter*, rubefaction is the only result, an insufficient amount being left upon the surface to produce a blister. Vesicating collodions are preparations which, after evaporation, leave a thick coating upon the cuticle, containing a certain quantity of irritating principle: these may be considered in their actions as intermediate between the fluid and solid preparations, combining, as they do, the properties of both. It is our especial vocation on the present occasion to take into consideration the construction of a formula for the *collodium vesicans*. This preparation, although constantly used by some very extensive practitioners, is far from being generally introduced, which may be accounted for from the circumstance that there is no authorized formula for its preparation, if we except M. Altigner's cantharidal ether and collodion, one to two parts of the latter for children. Each maker has then his own formula, which might be excellent, or *vice versâ*, as the case may be. It will be our endeavour to provide a formula which shall have sufficient strength to produce immediate vesication, at the same time having a due regard to the economy of the method. To insure prompt action, it is not only necessary to introduce a sufficient quantity of blistering material, but it is also requisite that the excipient, or film in which it is applied, should be permeable enough to allow the active principle to transude freely through it. The tough and contractile film left by the ordinary collodion is almost worse than useless, as immediately on drying, the cantharidin at the surface and in direct contact alone exerts any beneficial effect; an ordinary blister might be applied for any length of time, without producing a sensible result, if a dry film of plain collodion be interposed between the blister and the cuticle.

"First, then, let us examine the texture of a collodion film, to mark its applicability in the present case. If we pour upon a glass slide some recently prepared collodion, and then examine it by the microscope, it will present the following appearance: A pretty homogeneous and smooth ground, but running through which are slight ridges, which produce large honeycomb markings. These ridges are caused by the quick evaporation of the ether; the whole is interspersed with filaments of partially disorganized cotton in a semi-gelatinous state. However carefully the cotton may be prepared, it is next to impossible to get rid of these fibres, some portion always escaping the perfect action of the acids. If we can add a small quantity of glacial acetic acid to the collodion, we shall find the character of the film greatly changed. From the slower evaporation the honeycomb ridges are no longer palpable, whilst the solubility is so much increased that the filaments are found to have disappeared. This film is perfectly uniform, but it presents this peculiarity, that it gradually dries into a mass of jelly like globules, which, however, possess but little cohesion; when dry, it is very short, for if the finger be run up the glass, instead of leaving it as

a tough skin, it collects as a moist crumbled mass. Having so far seen that the glacial acid, besides destroying the contractility, gives it the properties of porosity and slowness in drying, it follows that such a collodion is particularly suited for the application of any vesicant which we may intend to apply, instead of being a varnish which hermetically seals up the active matter. Glacial acetic acid is one of the best direct solvents of cantharidin with which we are acquainted. Pure cantharidin was found to be very soluble in that acid, a saturated solution depositing it unchanged on evaporation in hard mica-like crystals. The principle then that we propose is, to exhaust cantharides by a mixture of ether and acetic acid, and to convert these into a collodion by the addition of gun-cotton. Take cantharides ℥vj;[1] Ether from methylated spirits f℥xiij, or q. s.; Glacial acetic acid f℥ij; Gun-cotton ℥ss; Methylated spirits of wine f℥vij, or q. s.

"The cantharides, coarsely powdered, are placed loosely into a displacement apparatus, the flow of which can be regulated by a tap; upon this is poured the ether and acetic acid, previously mixed together; after the whole has passed through, it will be found that the *débris* has retained by absorption seven fluidounces, which must be displaced by the gradual addition of an equal bulk of methylated spirits. If properly done, there is not the least danger of the admixture of the spirits with the percolated menstruum, as the animal substance of the flies swells considerably under the prolonged influence of the spirits of wine, so that the same bulk will be insufficient to quite displace the ether. The ethereal solution should then be made to measure exactly f℥xv, by the addition of a little spirit, and may then be converted into collodion by the addition of the gun-cotton. Mylabris cichorii, treated in the same manner, gives even a more powerful vesicant than the cantharides. These flies, which constituted the blister of the ancients, are, I believe, to be procured in great profusion in India. The percentage of cantharidin is larger in these flies than in the cantharides, but they resemble them in all respects excepting their physical appearance.

"The most effectual method of using the collodion is as follows: The part upon which the vesicle is to be raised should be painted with the vesicant to the desired extent, bearing in mind that the blister produced always extends to about one-tenth of an inch beyond the margin of the space covered by the collodion. Care should also be taken that there is a considerable thickness of collodion upon the surface. To insure this the brush should be passed over and over again until about ʒss has been used to the square inch, or less when operating upon a tender epidermis. It is desirable to place a piece of oil-silk, or, what is still better, a piece of sheet gutta-percha, two or three inches larger than the surface of the intended blister; the gutta-percha is not spoiled, whilst it hastens considerably the action of the collodion.[2]

"In ten minutes, or a quarter of an hour if the cuticle is hard, the collodion should be wiped off with a little cotton-wool moistened with ether, when the blister will almost instantly rise. The principles which advocate the use of the collodion may be enumerated as follows: Cleanliness, ease in applying to any wrinkled or jointed part, where the ordinary blister would be likely to be displaced, prompt vesication, and safety from strangury. Any of these properties would be sufficient individually to recommend its employment in preference to the other preparations."

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15. *Solid Creasote.*—M. Stanislaus Martin remarks (*Bulletin Générale de Thérapeutique*) that creasote is much employed as a popular remedy in the case of pain produced by caries of the teeth, but as the fluidity of this product is very great, its use often causes, in the mouth of persons using it, effects of a serious nature, which might be avoided by solidifying it in the following manner: ℞.—Creasote, part xv; collodion, part x. M.

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[1] Two ounces more cantharides to the above proportions, make a very powerful collodion.

[2] The action of the gutta-percha is easily explained, by its stopping the evaporation of the exhalations of the skin; in this manner the scarf-skin is rendered moist and permeable, the ordinary dry and harsh texture of the skin militating greatly against the production of a vesicle.

The collodionized creasote has the consistence of jelly, and is used in the same manner as the simple substance. It has, however, this advantage, that it forms a varnish, seals up the orifices in the carious tooth, and prevents the atmospheric air from reaching the dental nerve.

Creasote is known to coagulate albumen, and it is probably to that property that its astringent and hæmostatic action is due. We think that the new form which we have given to this substance will allow surgeons to use it whenever they wish for a *stimulating* agent combined with isolated action.—*Glasgow Medical Journal*, April, 1862.

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16. *Inefficiency of Hyoscyamus as usually prescribed.*—M. DONOVAN thinks that unnecessary caution is taken by physicians who administer tincture of henbane in doses of one or two drachms. He and some other persons have each taken an ounce of the tincture without any effect, the tincture having been prepared from the plant in its cultivated state, its wild state, dried, recent, and grown in various places in the British Isles. M. Hirtz informs us (*Bull. Gén. de Thérap.*) that the extract of the leaves of hyoscyamus was given to patients in the dose of 50 to 75 centigrammes a day with results only slightly marked, and even these rather inconstant; a gramme (15.43 Troy grains) was sometimes given without any observable effect.

In order to compare this result with his own, M. Donovan evaporated one ounce of the tincture (the same as had already served for his former experiments) until it assumed the usual consistence of extract of hyoscyamus. The evaporation was conducted at a very low heat, and the weight of the extract ascertained with great care; it weighed 8.4 grains. This is very little more than the half of the dose of the extract which M. Hirtz administered without any observable effect. "I might, therefore," says Dr. D., "have made the dose of the tincture taken by myself and friends at least two ounces without any discoverable result. If two ounces had no effect, three ounces could not have much, unless it produced intoxication. In fine, I venture the opinion that tincture of the leaves of hyoscyamus should be expunged from the Pharmacopœia. Those physicians who venture on two-grain doses of extract of henbane will learn with interest that M. Hirtz gave fifteen and a half grains without any effect. His were clinical experiments, and therefore afforded the best opportunities for observation. I believe the case would be very much otherwise if the seeds were used instead of the leaves."—*Dub. Med. Press*, May 28, 1862.

[It is difficult to reconcile this statement with the case communicated by Dr. Keating to the Philadelphia College of Physicians (see number of this Journal for July, 1858, p. 96), in which very profound and alarming narcotism followed the administration of three grains of Tilden's extract of hyoscyamus, or, at least, what was sold and labelled as that article.]

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

17. *On the Exhibition of Food in Typhoid Fever.* By M. HERARD.—The following remarks made by M. Hérard, in a clinical lecture at the Hotel Dieu, at Paris, are of particular interest at the present time, especially to the medical officers of our army hospitals:—

"The treatment of typhoid fever is of course different according to the theory adopted on the nature of the disease. The practitioner who views in typhoid fever follicular inflammation of the intestinal tube, an ulcerous affection of Peyer's glands, and consequent absorption of poisonous fluids calculated to induce a septic condition, consistently prescribes antiphlogistic remedies in the incipient stage, and tonics in the more advanced period of the disease. Likewise, those who conceive that the decomposition of the local secretions is the primary cause of the infection of the system act consonantly with their theory

in systematically exhibiting emeto-cathartics and laxatives. In these opinions, however, M. Hérard does not participate; while taking into serious account the intestinal eruption, which, like that of smallpox, induces a certain amount of circumambient inflammation, he cannot admit this to be the proximate cause of typhoid fever. No concordance can be traced between this anatomical change and the general condition of the patient, the gravity of which must be acknowledged to be entirely independent of the local injury. Hence the latter cannot be taken for a guide in the choice of the medication most appropriate to a fever in which the collapse of vital power and the obvious tendency to hemorrhage and mortification point most distinctly to a primary alteration in the composition of the blood. M. Hérard does not deny that an emeto-cathartic may be proper to remedy the foul state of the primæ viæ, so common in the early stage of typhoid, but he can neither concede to aperients, to venesection, nor to local bloodletting, the privilege of being the exclusively appropriate modes of treatment of the disease.

"In typhoid fever M. Hérard proceeds as follows:—

"In moderate, and *à fortiori* in mild cases, he refrains from any active interference calculated to debilitate the patient, and to cause the disease to assume the dangerous form which justly occasions so much dread. M. Hérard prescribes an emeto-cathartic, one or two doses of saline aperients, a few baths if the skin be very hot and dry, and wine and water. Baths restore the functions of the skin, and usually induce sleep. In the adynamic variety he resorts to tonics, stimulates the system with Malaga or Bordeaux wine, either in drinks or in enemas, prescribes from half a drachm to a drachm of powdered cinchona bark, in coffee without milk, and also recommends various stimulants, such as musk, camphor, acetate and carbonate of ammonia. He causes, at the same time, the eschars to be covered with powdered Peruvian bark, and requires from the nurses the most strict attention to cleanliness. In the ataxic form, the most fatal of all, bloodletting, leeches, blisters, are unavailing; all remedies seem powerless. In order, however, not to appear entirely inactive in cases of such dire gravity, he prescribes stimulants, dry cupping of the extremities, blisters to the nape of the neck, and cold effusions cautiously administered. In the thoracic form, which this year has been the most prevalent, blistering and cupping, with scarification, are the remedies which M. Hérard has chiefly resorted to.

"The above is a brief summary of the treatment appropriate to typhoid; but in the management of the disease the all-important, the capital question is that of food.

"Despite the wise precepts of Hippocrates, said M. Hérard, despite the recent researches which have only confirmed their value, we are still all more or less influenced by the now exploded doctrine of irritation. The terms fever and food still appear to imply a contradiction, although it is but too certain that in typhoid prolonged abstinence leads to the most disastrous results.

"Some ten years ago, M. Hérard was in attendance on a lady suffering from a moderately violent attack of the malady under consideration. Cerebral symptoms having set in, a consultation took place, and an eminent professor of the school of medicine recommended absolute abstinence from food, and the daily exhibition of one or two glasses of seidlitz water. The latter part of the prescription M. Hérard took upon himself in some degree to modify, but the abstinence was strictly enforced. After two or three weeks' treatment the pulse rose from 110 to 120, nocturnal agitation set in, with wandering, delirium, vomiting, and diarrhœa. On the following days the frequency of the pulse increased to 145, vomiting became incessant, the diarrhœa incoercible, the delirium constant; the tongue was red, and thrush appeared over the entire mucous lining of the mouth. Another consultation was deemed expedient; the three gentlemen whose opinion was requested viewed the case in a different light. One pronounced the patient to be suffering from softening of the stomach; the others, struck by the pinched countenance, the emaciation of the entire body, and the cough which had set in in the incipient stage of the disease, believed in galloping consumption, and proposed cod-liver oil. M. Hérard, who had long been acquainted with the patient, found it impossible to adhere to any of these views, and, moreover, unable to venture, under the existing circumstances, on

the exhibition of cod-liver oil, surmised that the previous protracted abstinence might possibly have some share in the aggravation of the symptoms, and determined upon trying the effects of nutriment. He found it almost impossible at first to carry out this plan, and it was with the utmost difficulty that a few drops of iced beef-tea were swallowed. He succeeded by dint of perseverance, however; and when the food remained on the stomach, and in proportion to its increase, the pulse fell from 145 to 130, 120, 115, and 100; the delirium yielded, and, in short, the patient recovered.

"M. Hérard is convinced that similar cases are of not unfrequent occurrence, and that the dangerous symptoms of the ataxic form of typhoid are often induced by the strict abstinence previously enforced. In a highly interesting paper on the subject, M. Marotte has established that vomiting, diarrhœa, and delirium, more especially the latter, are characteristic of starvation. In a lecture recently published, M. Trousseau already pointed out the striking analogy existing between the more serious symptoms of typhoid and those of autophagy consequent on protracted abstinence. The valuable experiments of M. Chossat may further be adduced in illustration of the theory which accounts for this extremely important fact, and must lead to a complete change in the treatment of typhoid fever.

"The expression we advisedly use is treatment, not diet. Nutriment here must be viewed not as an adjuvant, but as the principal medical agent. It has been objected that if food be exhibited, indigestion and emesis must follow. This is correct after protracted abstinence, and proves the necessity of early alimentation, otherwise the digestive powers of the stomach become impaired and the food is rejected. Opponents of the method further urge the impossibility of venturing on the exhibition of nutriment, on account of the deposits which necessarily exist on the mucous surface of the stomach, and poison the breath of the patient by their decomposition. Now these deposits are frequently but one of the consequences of abstinence, and if the tongue and gums are cleansed with a brush impregnated with honey of roses or syrup of mulberries, the sores do not form again after the ingestion of food. M. Hérard had recently under his care, at Lariboisiere, patients who have fasted for three weeks, and who displayed marked distaste for any kind of nutriment. The gums were covered with sores, the breath was foul; but after cleansing the mouth and scraping the tongue, food, which these patients were compelled to take, produced its usual salutary effects, and in a few days was accepted with pleasure and with the most beneficial results. M. Marotte relates the case of a young man, aged twenty, who, at first compelled to eat, soon took his food with pleasure, and ultimately recovered in an unhoped-for manner. The propriety of feeding patients suffering from typhoid has also been questioned in another respect; the presence of intestinal ulceration, of tympanitis and diarrhœa had been viewed as a direct counter-indication to the exhibition of nutriment, and as the probable cause of the most perilous symptoms in case this method was resorted to. This fear is entirely chimerical. You must not, moreover, forget that the cachectic condition of the patients is the greatest possible obstacle to the healing of the ulcers, and that the latter are portals through which poisonous principles will most readily be admitted. Subjects affected with intestinal ulcerations should be fed, and the ulcers, nevertheless, decrease in size, and heal in the same manner as bed-sores, so common under similar circumstances, yield to the influence of generous diet. Some short time ago, a woman was admitted into the Hôtel-Dieu, on the twentieth day of a typhoid fever complicated by extensive mortification in the region of the sacrum. Nutriment, appropriate in nature and in quantity, was gradually exhibited, and the wound speedily lost its pale aspect, assumed a more healthy hue, granulated, and healed. Had abstinence from food been here persevered in, she would very probably have perished; but a contrary course was followed, and she recovered rapidly. Another beneficial effect of nutriment is to shorten the duration of the convalescence, which formerly was interminable after putrid fever. Patients, who have received adequate support during the progress of typhoid, have been known to pass without any transition from disease to health, and to walk in the garden of the hospital on the very first day they left their bed.

"It is not unimportant to inquire what should be the nature of the nutriment allowed. It was formerly the custom to exhibit food when only the feverishness had subsided, and it sometimes unfortunately happened that the delay was so long as to render the food superfluous. Other practitioners prescribe broth, under the impression that broth is sufficient support to the system. Broth is doubtless a nutrimental substance; we are all acquainted with its restorative powers, but we must not exaggerate its value. M. Bouchardat demonstrates that a quart of broth contains but six drachms of solid nutriment, two of which are saline ingredients; subtract from the remaining four drachms a certain amount which passes through the kidneys, and you will doubtless agree with me that the residue affords but insufficient support to the system.

"M. Hérard proceeds then to describe his mode of administering food in typhoid. Soups are, in his opinion, the best articles of diet; egg-flip is often useful, and contains a large proportion of nutriment especially applicable in the thoracic variety of the disease. Jellies are also advantageous, and when, on account of their volume, soups are not easily digested, the professor, even at an early period of the fever, does not hesitate to recommend the suction of a mutton-chop. Patients, whose stomach rejects the weakest broth, frequently digest with facility a small piece of broiled beef or mutton. He is no friend of the debilitating *tisanes* and diet-drinks usually prescribed, but agrees with M. Monneret in the utility of wine, as a stimulant of the vital powers. The beverage he recommends is weak wine and water, and, in addition, eight ounces of Bordeau or bark wine, to be taken in enemas if necessary. When the digestive powers of the stomach have been much impaired, he conceives that pepsine, acting as a kind of ferment, promotes the assimilation of the food and gives the gastric viscera time to recover their secretive action, the patient, in the meanwhile, not suffering from the effect of injurious abstinence. Fifteen grains of pepsine may therefore be exhibited in a wafer with animal food.

"In addition to these physical restoratives, M. Hérard has recourse to moral agency. The greater number of individuals suffering from typhoid fever in the hospitals are young people of both sexes, not only strangers in Paris, but often foreigners. Their isolated condition, combined with the knowledge that they are labouring under serious illness, has much to do with the low condition into which they speedily fall. Hence the importance of encouraging such patients by a kindness of manner and of language calculated to improve their moral condition, and to counteract the unfavourable influence exercised upon their system by the distressing circumstances under which they happen unfortunately to be placed."—*Journ. Pract. Med. and Surg.*, May, 1861.

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18. *Quinine as a Prophylactic of Fever.*—The powers of *quinine* as a prophylactic, remarks Dr. Smart, in his account of the climatology, etc., of Hong-Kong, were proved extensively among the crews of the gunboat flotilla employed on the Canton River. Although those little vessels were constantly on river service, often remaining the night with their bows driven on the mudbanks, their crews sleeping on deck in preference to the close heated atmosphere of 'tween decks, having no medical officer on board, and thus receiving merely an eleemosynary medical supervision from the larger men-of-war they came near, yet they seemed not to suffer disproportionately from malarious fevers, excepting those of the intermittent type. Their comparative exemption I considered to be due to the abundant supply of quinine wine ordered for them by the medical inspector of the fleet. On the slightest occasions of indisposition they had recourse to their commanding officers, who held the quinine bottle at hand, in the preventive and curative powers of which the seamen seemed to have the utmost confidence. —*Trans. Epidemiolog. Soc. of London*, May, 1861.

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19. *Clinical Inquiry into the Use of Iron in Pulmonary Consumption.*—In our No. for April last (p. 523) we gave results of the clinical trials by Dr. R. P. Cotton on the action of steel in phthisis.

More recently (*Med. Times and Gazette*, March 22, 1862) Dr. James Jones, Physician to the Infirmary for Consumption, in Margaret Street, has published the results of his clinical observations on the same subject.

Passing over the writer's physiological and pathological speculations, we shall give his practical deductions as of most importance.

"*The mode of administering iron in phthisis*" Dr. Jones conceives to be "a subject of the greatest importance to its success as a remedy. In prescribing it it is necessary that we should bear in mind the object to be accomplished by its exhibition, the supply of the *deficiency* of one of the *normal elements* of the blood. We must give iron as a *blood food*, carefully regulating the quantity by the requirements of that fluid. When iron is given in over-doses it soon induces headache and derangement of the organs of digestion. There is nothing more common than to hear from patients that steel has always disagreed with them. This intolerance of iron may generally be referred to two causes: Firstly. The unfitness of the preparation. Secondly. The excess of the dose.

"With regard to the first of these points it is important that the preparation of iron which is used should have the following qualities: First. Perfect solubility. Second. A composition in harmony with the digestive fluids, the blood, and the other fluids of the body. Third. Compatibility with such drugs or medicines as may be required by the varying phases of the disease. The perchloride of iron possesses all these properties. It is perfectly soluble. Chlorine is an abundant and important element of the principal fluids of the body. It is therapeutically compatible with most of the medicinal substances used in the treatment of phthisis, such as quinine, morphia, chloric ether, hydrochloric acid, phosphoric acid, chlorate of potass, etc. I have tested experimentally the majority of the preparations of iron, and find none so generally to answer as the perchloride. I have found it occasionally to cause nausea, but this soon ceased on lessening the dose. I have used the pyro-phosphate of iron in several cases where the perchloride was objected to. Its effects have satisfied me that it is in many respects equally as useful as the perchloride. It appears to possess neurotonic properties, and to act very similarly to a combination of perchloride of iron with phosphoric acid. The syrup of superphosphate of iron introduced by Dr. Routh is also a useful preparation. Secondly, with reference to the dose. I have reason to believe that the disuse into which the preparations of iron have fallen in the treatment of consumption is mainly referable to the custom of prescribing it in large doses. Disorder of the organs of digestion, also headache, and other symptoms of either hyperæmia or of the presence of an unnecessary substance in the blood, are the consequences of its excessive use.

"In healthy blood the quantitative correlation of its elements is pretty constant, but in the cachexia of tuberculosis this condition is disordered, and the object of our treatment should be the restoration of the normal relation of its elements.

"Thus, in using iron as a curative agent, the quantity should be sufficient, and *only sufficient*, to supply the waste of that element shown by the diminished numbers of red corpuscles. Any excess of this quantity tends to embarrass the system by the presence of an unnecessary element. It is obvious that the dose must vary according to the requirements of each case. I am convinced, by experience, that the dose generally given is far too large. When the state of anæmia is strongly pronounced, the dose of a ten per cent. tincture of perchloride of iron may be fifteen minims three times a day, but it will soon be found necessary to reduce it considerably. In a large number of cases, from three to five drops twice or three times a day will be found sufficient to meet the requirements of the system. In these small doses the remedy may be used for a long time. I have in many instances exhibited it continuously for more than twelve months without the occurrence of any of the symptoms mentioned as interfering with its use.

"In order to derive the full benefit from the use of iron in phthisis it must be continued for a long time; for it is not only necessary to establish a healthy sanguification, but also to *maintain* it. The condition of cachexia attending tuberculosis tends to lower the standard of the blood, and this tendency is constant. If by any means a healthy condition of the blood be produced, it cannot long be maintained without the continued use of hæmagenetic agents; hence the necessity for the exhibition of iron over a long period. I would dwell upon this point as one of paramount importance. It is in the continuous use of it

over a long time—one, two, three, any number of years—as long as not only the condition of, but the tendency to, tuberculosis exists, that its value as a remedy is manifested.

"The improvement in the state of health which takes place during the exhibition of perchloride of iron shows itself in the increase of bodily vigour and capability of undergoing fatigue, the improvement of the appetite, and the abatement of the well-known symptoms of impaired digestion, such as flatulency, heartburn, acidity of the stomach; in the diminution or cessation of night perspiration, and of the tendency to perspire on slight exertion; in the abatement in the severity of the cough; in the decrease in the quantity of expectoration, and in the less frequent return or complete absence of hæmoptysis.

"While endeavouring to show the great importance of iron in the treatment of consumption, I wish to guard against the possibility of being misunderstood. My desire is merely to direct attention to its claims as a powerful agent in the treatment of that disease, to point out the proper mode of its administration, and to assign to it its place in the materia medica for consumption. I do not propose the use of iron as a substitute for cod-liver oil. Each of these agents has a distinct function to perform in aiding nutrition and promoting a healthy sanguification. In a large number of cases both are necessary, each acting a part peculiar to itself, yet complementary to the other."

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20. *Chlorate of Potassa in Phthisis.*—Dr. R. P. Cotton has experimented with the chlorate of potassa on 25 patients in the Hospital for Consumption, Brompton, and his results are by no means favourable.

"The generally acknowledged tonic, antiseptic and upholding influences of the chlorate of potassa, have caused," he observes, "this agent to be rather extensively tried in consumptive cases. The results, however, have been very variously stated; but, in a recent number of the *Dublin Quarterly Medical Journal*, a physician of Belfast has unhesitatingly brought it forward as a *specific* for pulmonary tuberculosis, at least in the first and second stages of that disease.

"Of the twenty-five cases for which I prescribed it, fifteen were males and ten females. Eight were in the first stage, eight in the second, and nine in the third stage of phthisis. They varied in age: one had reached fifty; but the rest were from twenty to thirty years. Notes were regularly taken by Mr. Harington, resident clinical assistant.

"Of the entire number, five improved considerably, four improved a little, and sixteen seemed to derive no advantage. Of the latter number, four, at least, may be said to have been more or less benefited when the chlorate was exchanged for some other tonic.

"The period during which it was administered varied in different cases. In this, as in the preceding experiments, my habit has been to continue the same treatment for at least three weeks. If, at the expiration of that time, very little or no progress has been made, I have tried something else; but whenever there has been encouragement to proceed, I have done so. My notes record that the chlorate of potassa was taken in five cases, for periods varying from six to ten weeks; the average being four weeks. The dose was ten or twelve grains three times a day.

"In twelve cases cod-liver oil was occasionally, but not quite regularly, taken at the same time. It would, of course, have been more satisfactory had the chlorate in every instance been administered alone; but many patients on entering the hospital are already so practically acquainted with the good effects of the oil, that it would be cruel to deprive them of its use, whilst in such cases the attempt to do so would in all probability only prove abortive, for I have many times discovered that patients for whom I have not prescribed cod-liver oil have very significantly testified to its usefulness by taking it clandestinely. In analyzing those cases in which the oil had been taken, I find that six belong to the list of nine more or less improved patients.

"Nine increased in weight whilst taking the chlorate, seven lost weight, and nine underwent no change. Of the nine who gained in weight, six belong to the number who had also taken, more or less, the cod-liver oil.

"Of the improved cases, three were very decided, the patients having expressed themselves as feeling better than they had done for many months; two of these, however, belong to the class who had taken the oil. It was generally observed that those patients in whom there was any perceptible improvement were of broken down and cachectic constitution; indeed, just in that condition in which, without regard to their being phthisical, the chlorate of potassa might very hopefully have been prescribed.

"The preceding facts, taken in connection with the very potent influences of improved sanitary and dietetic arrangements to which all the patients were subjected on entering the hospital, would seem to justify the following conclusions:—

"1. That chlorate of potassa has no *specific* action upon consumption.

"2. That its usefulness, even as an auxiliary in the general treatment of phthisis, is very questionable, and is probably limited to that cachectic class of cases in which it and allied remedies are so often serviceable."—*Med. Times and Gazette*, May 24, 1862.

[These conclusions are confirmatory of those of Dr. FLINT, whose interesting report will be found in our No. for October, 1861, p. 321.]

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21. *Delirium Tremens treated by Large Doses of Digitalis.*—In our No. for January last we quoted four cases of delirium tremens successfully treated by large doses of digitalis. Another case has been related (*Med. Times and Gaz.*, April 26, 1862), which occurred at the Radcliffe Infirmary, Oxford, under the care of Mr. HESTER. "A drayman, aged 28, of very powerful frame, was admitted for a contused wound in the occiput, caused by falling backwards whilst intoxicated. The hemorrhage, which had been very free, was checked by the application of a little pressure; and being put to bed he soon fell asleep. Next day he appeared to be suffering from the effects of his debauch, and, as he craved very much for a drop of beer, a pint of ale was allowed, which made him feel more comfortable; but in the evening he was seized with a violent fit of epileptiform convulsion, which lasted for about ten minutes. Another half pint of ale was given to him, with the same result as before; and during the night he had two slighter fits of the same character.

"On the second day he complained of pain in the head, and, his bowels being confined, a good dose of calomel and jalap was administered, to be followed by sulphate of magnesia every four hours, and cold applied to the head. His bowels were freely opened, and he was quiet throughout the day and the following night.

"On the third day he became restless and fidgety, and was with difficulty kept in bed, being frightened by some imaginary object which he said constantly pursued him. In the night he got out of bed, and had to be carried back by force, in spite of his most violent efforts to the contrary. A strait-waistcoat was applied, and half an ounce of tincture of digitalis given in water. He soon became quiet, muttering a sentence in low voice now and then, and continued so through the night, but did not get any sleep. Next day he was restless, and towards night became again very violent. A second dose of the digitalis was administered, and in a few minutes he fell asleep, and slept through the night and the greater part of the next day. After this he became very quiet and comfortable, and has progressed up to the present time very satisfactorily, the wound having nearly healed."

Dr. MORRELL MACKENZIE has tried the tincture of digitalis in three cases of delirium tremens (*Lancet*, March 8, 1862) in the doses recommended by Dr. Jones, of Jersey, and in two of these cases death occurred, and in the other the digitalis had to be abandoned, and recourse had to stimulants and opium, under which the patient recovered. "One of these patients, W. P——, aged twenty-eight, a potman, and an habitual dram-drinker, was admitted into the London Hospital, under the care of Dr. Fraser, at seven o'clock in the evening of the 6th of July, 1861. Though he was fearful and highly tremulous, his case did not appear unusually severe. On auscultation, there were no signs of cardiac disease, and half an ounce of the tincture of digitalis was accordingly prescribed. A nutritious diet was ordered, but no stimulants were allowed. An hour later the pulse, which was previously at 84, was reduced to 60; it was full and regular. At ten

o'clock the dose was repeated, and the patient passed a quiet, though sleepless, night. In the morning another half ounce was given, and in the afternoon the dose was again repeated. On both occasions, about half an hour after taking the medicine, vomiting supervened. There was no increase in the renal secretion. The patient did not appear much distressed by the sickness, and in the afternoon he had a steady pulse of 68. During the day he became very restless, and, instead of being timid and subdued, was now fierce and fearless, requiring powerful restraint. In the evening he was still more violent, and at nine o'clock the digitalis was again repeated, but this time only two drachms were given. Between ten and eleven, being now even more excited, it was determined to discontinue the digitalis and try opium; but before the latter drug could be administered, after a short but violent struggle with his attendants, which at first appeared voluntary, but afterwards convulsive, the patient suddenly expired.

"The following extract from the account of the post-mortem examination shows the condition of the heart after death, and perhaps some relation between the therapeutics and the pathology: 'Little fluid in the pericardium, in which the heart lay like a flaccid empty bag. To the touch, before removal, the cavities of the heart and large vessels seemed almost empty. On cutting across the great vessels, only a small quantity of dark fluid blood escaped: *the whole heart felt flaccid, and its cavities did not contain half an ounce of blood*.' I may mention that there was no appearance of disease in the brain or membranes, except that the dura mater was slightly adherent to the skull in the parietal and occipital regions. There were a few drachms of serous fluid in the lateral ventricles.

"In the case of the next patient, who died after the administration of half an ounce of the tincture of digitalis (which was given to him by a practitioner shortly before he was brought to the hospital), the man was admitted in a semi-comatose condition, from which he never roused, and unfortunately his friends objected to an autopsy.

"The third case was that of H. N——, aged forty-five, a butcher, admitted under the care of Dr. Frazer, on the 14th October, 1861, with the usual symptoms of delirium tremens; 'the hands and tongue were tremulous, and, though slightly excited, he was quite sensible.' The opiate treatment was adopted, but, no improvement taking place, it was determined to try digitalis. Within eleven hours the patient took an ounce and a half of the tincture of digitalis, in three half-ounce doses. Though the frequency of the pulse was diminished, the nervous symptoms were aggravated; and, from the report of Mr. Fred. Carter, it appears that 'an hour after taking the draught (the third dose) the patient became very troublesome and violent—so much so that he was removed to the attic and placed in a strait-jacket.' Opium in large doses was now prescribed, and the patient was put under chloroform, in order that the system might be more readily affected by the narcotic. On the 29th October, after taking five drachms of the tincture of opium in nineteen hours, he slept for some hours, and awoke quite collected. The effects of the digitalis were very similar to those produced in the potman who died, for in both the timidity of delirium tremens gave way to the fury of acute mania.

"With regard to the cases recently reported in the medical journals, it appears from Dr. Harrison's letter in the *Lancet* of Feb. 15, that before any digitalis was administered the patient was 'quieter,' an admission which somewhat detracts from the supposed curative effects of the digitalis; and in the case reported by Dr. Duchesne, it is stated that 'it was a primary attack occurring in a young man of tolerably regular habits'—circumstances so favourable in themselves, that almost any remedy might be expected to prove especially useful. It is to be observed, too, that in both the cases recently placed before the profession large doses of opium had been previously administered; and it is not difficult to suppose that an abnormal condition of the nervous system should have delayed the absorption of the narcotic, which, afterwards taking effect, produced the curative results ascribed to the digitalis.

"In conclusion, I may remark that 'the usual hospital treatment energetically pursued,' consisting of stimulants, nourishing food, and opiates, rarely fails; and that it is seldom that a patient dies in this hospital from delirium tremens, unless his case is complicated with serious traumatic injury."

22. *Treatment of Pleurisy.*—M. TROUSSEAU rarely employs bloodletting in the treatment of pleurisy; he scarcely ever cups even at the commencement of the disease. As an antiphlogistic, he prefers calomel in minute doses, administered, according to the method of Low, aconite and digitalis. A favourite mode of treatment in these circumstances is the following: calomel, a grain and a half, powdered sugar, a drachm and a half. To be carefully mixed and divided into twenty powders, of which one is to be taken every hour or every two hours. Tincture of aconite, and tincture of digitalis, of each fifteen drops; ordinary julep, five ounces. A tablespoonful to be taken every two hours. The pleuritic pain may be relieved by the application of a compress soaked in chloroform, or in a watery solution of opium. The part having been rubbed for five minutes with the latter preparation, a moist rag is to be placed over it and covered with a piece of oiled silk.

When pleurisy is complicated with effusion, M. Trousseau has never recourse, in order to favour the absorption of the serous fluid, to blisters, so generally used in this state. Blisters, and especially large blisters, present several disadvantages; they cause great suffering, and are often the cause of ecthyma, abscesses, boils, carbuncles, erysipelas, and other severe accidents. Not long ago, there was in the Hôtel Dieu a patient who had been treated outside on account of pleurisy, and who, as the result of a blister, presented two abscesses of the thoracic parietes, so situated that they at first appeared to communicate with the interior of the chest, or to be symptomatic of caries of a rib. They had, however, been produced by the application of a blister, and on being dressed in the usual way soon healed.

M. Trousseau's treatment of effusion varies according to its importance. If the amount is inconsiderable, he confines himself to the administration of digitalis in doses of ten or fifteen drops, of diuretic drinks, quiet, and a light diet. If the effusion is considerable and the pleurisy simple, he evacuates the fluid by means of thoracentesis. M. Trousseau does not allow himself, under these circumstances, to be guided by the degree of oppression. He has actually seen two women, affected with enormous pleuritic effusions, die suddenly, without having experienced the least dyspnœa. One of these patients was a nurse, at the twelfth day of pleurisy; she died while sleeping, and her countenance expressed the most perfect calm. M. Trousseau is inclined to share the opinion of Aran, who recommended that the operation should be practised as soon as the effusion had reached the fourth rib; in fact, in these circumstances he has never seen a bad result follow. However, he seldom operates until the fluid has reached the level of the clavicle.

The operation is very simple; the puncture is made in the fourth or fifth intercostal space. If there is no other means at hand to prevent the introduction of air into the pleura, the wide end of the canula is plunged into the fluid which is flowing out, and this latter is itself an obstacle to the entrance of air. Thus practised, thoracentesis has always excellent results when the effusion is on the left side, that is to say, when the pleurisy is simple; for Aran found, by clinical observations, that, ninety-five times in a hundred, pleurisy of the right side is secondary, being connected with tubercular disease of the lungs, while pleurisy of the left side is generally primary.

In the case of tubercular pleurisy with effusion, thoracentesis may be resorted to as a palliative, although necessarily with little chance of success. Topical applications are, however, often useful, particularly the repeated application of ioduretted preparations, and especially of the alcoholic tincture of iodine.—*Ed. Med. Journ.*, April, 1862, from *Journal de Méd. et de Chirurg. Prat.*, March, 1862.

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23. *Pneumonia in Infants.*—M. BARTHEZ, who is well known to the medical world by his valuable work on Diseases of Children, which he undertook in common with the late M. Rilliet, of Geneva, has lately given us an interesting account of his most recent experience on pneumonia in infants. From 1854 to 1861 he has in hospital practice observed 212 cases of genuine pneumonia in infants, and only lost two patients, both of which were affected with bilateral pneumonia. One-half of the children suffering from inflammation of the lungs

who came under M. Barthez's care were subjected to no treatment whatever; in a number of others the treatment was confined to an occasional purgative, emetic, or bath; and only in one-sixth of the cases active remedial measures were resorted to. Besides these, M. Barthez has treated a large number of similar cases in private practice with similar results. He therefore concludes that genuine and non-complicated pneumonia in children is, at least as far as Paris is concerned, a mild disease, whatever may be the seat and extent of the inflammation, the seasons, and the years, and whether the medication employed be active, insignificant, or absolutely none. Double pneumonia is, however, more dangerous, as two patients died out of thirteen affected by it. The age of the patients was between two and fifteen years. Pneumonia complicated with other diseases, such as typhoid fever, tuberculosis, etc., is of altogether a different character.

Concerning the duration of the several stages of the disease, M. Barthez remarked that if no treatment was pursued, resolution commenced between the sixth and eighth day from the commencement of the disease, and more especially on the seventh day; in some cases, however, it began as early as the fourth or fifth day, or was retarded till after the eighth.

A mild treatment produced no change in this respect; and the disease being essentially benignant, M. Barthez rejects the antiphlogistic treatment altogether, so much the more as he has seen that several children who were treated with bloodletting, etc., made a bad recovery, and for a long time remained pale and emaciated. In only four patients he found it necessary to have recourse to repeated phlebotomies; and in these instances resolution commenced on the fifth, sixth, seventh, and tenth days. If resolution has once begun, there is soon an end of the disease, viz., between two and six days, it being only seldom protracted from seven to ten days. This natural duration of the stage of decrease is not sensibly altered by any treatment: but if the latter is very active, the patient does not find any benefit from it. Pneumonia in infants generally terminates in ten days or at most within a fortnight, if left to itself; but if severe antiphlogistic measures are resorted to, the disease may be protracted. In double pneumonia a fortnight is generally the shortest term of the disease. The recovery is always most rapid in those children who have had no, or scarcely any medicine; these almost invariably get well within a fortnight, while in those who have been actively treated convalescence often lasts from fifteen to thirty days. As regards the seat of the affection, resolution is quickest if the middle part of the lung is affected; inflammation of the top and the base of the lungs has much the same duration. The general conclusion to be drawn from all the facts mentioned is, that careful attention should be given to hygiene, and that as little medicine should be prescribed as possible. Occasional emetics, purgatives, warm baths, or bloodletting are in certain cases useful for relieving the pain in the side and the oppression on the chest.—*Med. Times and Gazette*, May 10, 1862.

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24. *Treatment of Cancrum Oris.*—Dr. Alexander Keiller read before the Medico-Chirurgical Society of Edinburgh (5 March, 1862) a highly interesting paper on the nature, causes, and treatment of cancrum oris. With regard to the character and value of the treatment which he considers ought to be had recourse to in this disease, he remarks:—

"In the first or mildest form of stomatitis, viz., the simple *follicular* variety, which appears either in the form of *aphthæ* or *superficial ulcerations*, little more is required than attention to the stomach and bowels; for, by simply correcting any intestinal or gastric derangement, the follicular disease generally disappears. If local applications are necessary, borate of soda in solution, or solution of nitrate of silver (four or five grains to the ounce), will generally do all that is required.

"In the second or *ulcerative form* (which is of frequent occurrence, and if neglected, may prove in some cases serious), a tonic treatment is to be enjoined, and, above all, the administration of chlorate of potash, which Dr. West and others have called a specific in this affection. Dr. West gives it in doses smaller than those in which I usually prescribe it. I give ten grains every two or three

hours, and, when combined with the local application of Condy's solution every second day, and the free administration of wine and iron, I have seldom required to do anything else, except of course to remove any loose teeth or alveolar exfoliation acting as sources of irritation.

"In the third and dangerous form, to which I have more specially been referring, viz., the *gangrenous form of stomatitis*, the treatment is, like that of the others, twofold, *local* and *constitutional;* the *local* being here, however, much more severe, amounting to absolute destruction or removal of the morbid tissues by *cauterization;* the *general* or *constitutional* consisting in whatever will tend to build up and invigorate the system, such as quinine or other tonics, full diet with wine, together with ten-grain doses of chlorate of potass often repeated.

"The great object to be kept in view is the perfect arrestment or total removal of the gangrenous action; for, if we trust to the occurrence of a spontaneous cure, or allow the sloughing process to progress unchecked, which we are too apt to do on first seeing a case of this kind, we shall soon find it too late to have recourse to suitable treatment, the local death having stealthily extended beyond the bounds of arrestment, when even the most energetic measures will in all probability prove unavailing.

"There can be no doubt as to the propriety of at once attacking *locally* the local manifestation of the disease, whatever its real essence may be, for here the sooner we destroy, the less will be the ultimate destruction; and although it may, to those especially, who may not have witnessed cases of the kind, seem a cruel and uncalled-for procedure to cauterize the apparently slightly-affected cheek of a perhaps not unhealthy-looking child—a child whose appetite may be little affected, or whose pulse or expression may not indicate any immediate danger, although to others it may seem harsh, and may be unpleasant to ourselves, still the duty ought to be in all suitable cases timeously and properly done.

"Although it is now impossible to say what would have been the result of early and thorough cauterization, in the fatal case which recently occurred in the Children's Hospital (and of which a correctly coloured wax model is now exhibited), there can be no doubt that the serious nature of the case had been overlooked until the disease had made considerable progress, when the local applications first used were neither sufficiently corrective to change, nor sufficiently corrosive to destroy, the sloughy action in the parts involved.

"I believe that the issue would not have been different had the hydrochloric or other acid been applied on admission; and my reason for first applying the *perchloride of iron*, and also *Condy's solution*, was to see if either of these local remedies would have any beneficial effect along with the general tonic treatment which was at the same time studiously adopted. The mortification having in this case involved the entire thickness of the cheek, there was little hope of checking it after the admission of the patient.

"Be that as it may, from what I have seen and known of *cancrum oris*, I would rather, in any future case, be inclined to overdo than underdo—rather run the risk of disfiguring too much than of destroying too little; for cauterization, if not effectual, is worse than letting alone; and now that we can avail ourselves of the aid of chloroform, there need be no hesitation in at once setting about this to my mind essential matter. Without chloroform, it is a difficult as well as a painful task to apply caustic or other substance efficiently to the interior of a child's mouth, and especially so in the diseased condition we are now considering; for here the difficulty of seeing the internal sloughy surface to which the escharotic ought to be applied, is very much increased by the peculiar tense and tumid state of the affected cheek, which, even under chloroform, materially interferes with our getting at the exact part which we may desire to cauterize. In fact, this swollen and tense condition of the affected cheek, although an early and valuable external characteristic of the condition of the internal surface, is generally the cause of our not diagnosing and treating cases at the proper time, that is, before the sloughing process has extended outwards beyond the mucous or inner texture of the cheek, in which the disease usually commences, and to which, therefore, our local remedies ought to be early applied.

"With chloroform this difficulty is very much overcome, as was found in one

of the cases I have cited, and in which there can be little doubt as to the success of the local treatment which was had recourse to. The arrest of the disease was very apparent in that case, and the advantage of chloroform was undoubted, as it enabled me not only to displace the swollen cheek, but to expose its affected surface and the adjoining gums, and thereby allowed me to see what required to be done, and thus greatly facilitated the doing of it.

"In the case referred to, I used *nitric acid*, and, as stated in the report, found one application sufficient. The cheek was forcibly turned out, the tongue and adjoining parts were protected from contact with the acid, which, in the absence of a glass rod, was applied by means of a test-tube. Some apply it by means of lint or tow attached to a probe or quill, but the glass rod, or, better still, a *glass brush* (such as I now exhibit), answers every purpose required.

"In every case care must be taken to see that under the yellow slough or eschar left by the first cauterization, there do not lurk unaffected sloughy portions; if so, the acid should be reapplied on the following day, and the mouth should be occasionally syringed with solution of chloride of lime, in order to remove the putrid discharges and get rid of the gangrenous emanations which, so long as the dead and dying tissues are left exposed or unaltered, must necessarily prove highly deleterious, if they be not the more immediate and direct cause of death. The danger arising from the presence of decomposing matter cannot be too constantly borne in mind in dealing with cases of true cancrum oris; for, whatever be the exact pathological nature of the structural change—whether simply the result of an inflammatory exudation into tissues unusually prone to serous infiltration and capillary death, or consequent on contamination of the circulating fluids (a general blood-poisoned condition leading to a special disorganization in the affected parts), there is to my mind no great difficulty in accounting for the marked fatality attending the disease when allowed an unchecked course; indeed its fatality seems explicable enough, without looking for any cause of death *beyond or apart from the mouth itself*, for there we find *a mass of gangrene* which, having lost the inherent power as well as the inherent character of living tissue, is not only incapable of self-regeneration, but is most unlikely to be spontaneously separated or removed by absorption. It is, I consider, by no means improbable that death ensues in such cases not so much from any previous diseased condition or contamination of the blood, as from *the continued and unavoidable inhalation of the poisonous exhalations arising from the gangrenous degeneration within the mouth*, which must necessarily be a much more active, as it is doubtless *a much more direct medium of blood-contamination than mere local absorption*, which latter agency, together with the actual deglutition of the foul discharges from the affected structures, materially tends to destroy life.

"It appears to me, that children dying from unchecked cancrum oris are in a great measure *poisoned by the inhalation of the deleterious gases arising from their own oral textures* in a more or less complete state of putrefaction; and that this view of the cause of the extreme fatality of the disease not only explains the immediate cause of death, but points to the necessity for adopting the line of treatment I have so strongly recommended, in order to prevent the air inhaled from being thus directly poisoned.

"It may, I think, be safely affirmed, that so long as simple ulcerative action exists, this mode of death need not be feared; but that, whenever gangrene *from degeneration* takes place within the mouth, fatal consequences may accrue; for if foul air, under any circumstances, be poisonous—if the emanations given off from putrid animal matters be deleterious in proportion to the degree of concentration in which they are inhaled, what I have now advanced must, I apprehend, be correct. This view of the pathology of the disease, moreover, accounts not only for the efficiency of such substances as chlorate of potass in the milder and more curable form of stomatitis, but justifies us in preferring active and well-timed local, to less powerful or merely general treatment in gangrenous stomatitis, in which the air within the mouth is so polluted as to render the atmosphere, not only immediately around the unfortunate patient but throughout the entire apartment, in the highest degree offensive.

"If this be true (and those who have ever visited a well-marked case of can-

crum oris can vouch for the fact), the conclusion is obvious, and may be thus shortly put. If it be dangerous to allow a foul drain or open cesspool to pollute the air which enters the lungs, the sooner the nuisance is either removed or covered over the better. And this is exactly what cauterization accomplishes in the case of cancrum oris; for, if it have not the effect of immediately disintegrating and removing the entire putrid mass, it either so far changes its character, or, at least, for the time being so covers or crusts over the gangrenous degeneration, as to check or altogether prevent the farther escape of those offensive and most deleterious exhalations, which would otherwise freely mix with, and thereby render poisonous, what may be emphatically called the 'breath of life.'"—*Ed. Med. Journ.*, April, 1862.

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25. *Pathology and Treatment of Jaundice.*—Dr. GEORGE HARLEY read a paper on this subject (May 13, 1862) before the Royal Medical and Chirurgical Society.

It is universally admitted that the facility of the diagnosis of jaundice is only equalled by the obscurity of its pathology and the uncertainty of its treatment. In this communication, therefore, the author set about unravelling the nature of the various morbid conditions which give rise to it; and pointed out how, notwithstanding the seeming discord, they could all appropriately come under the two common heads of "jaundice from suppression of the biliary function," and "jaundice from the reabsorption of the secreted but retained bile." Moreover, Dr. Harley showed that the pathology of jaundice resulting from suppression is totally different from that arising from obstruction; and, consequently, that a line of treatment which would be appropriate and beneficial in the one form, would be detrimental, if not actually hazardous, in the other. Fortunately, however, the author pointed out a new method of distinguishing the two forms of the disease when all the ordinary means of symptomatic and physical diagnosis prove unavailing. The method consists in analyzing the urine, which, he finds, contains different morbid products according to the particular form of the disease. Thus, for example, in jaundice from suppression the urine contains only those biliary ingredients which exist preformed in the blood. In jaundice from obstruction, on the other hand, the urine contains, in addition to these, the materials generated in the liver itself, and which have been reabsorbed into the circulation from the distended gall-bladder and ducts. A simple mode of distinguishing the two conditions is, to add to about two drachms of urine half a drachm of strong sulphuric acid, and a fragment of loaf sugar the size of a pea. If at the line of contact of the two liquids a scarlet or purple colour is produced, it proves that the acids of the bile are present, and the case may consequently be put down as one of jaundice from obstruction. On the other hand, if no bile-acid reaction, but merely a browning of the sugar, be observed, the case is in all probability one of suppression. Dr. Harley pointed out, however, that care must be taken not to confound the two cases; as jaundice from obstruction, especially the severe form, often merges into jaundice from suppression. The author also confirmed Frerich's statement regarding the presence of tyrosine and leucine in the urine of acute atrophy of the liver; and further stated that he had also found these substances in the urine of chronic atrophy, so that their presence might aid in the diagnosis of the latter as well as of the former condition of the hepatic organ. Several cases were cited illustrating the value of the different methods of diagnosis; and the author concluded by pointing out the class of cases in which mercury and other remedies were likely to be beneficial, and where they were likely to do injury. He specially recommended the employment of benzoic acid in jaundice from suppression, and inspissated bile in that arising from obstruction, in which latter class the patient frequently dies from slow starvation, in consequence of the absence of bile in the digestive process causing imperfect assimilation of the food to take place. Dr. Harley also called special attention to the fact that bile, as now employed, more frequently does harm than good; for, when given along with the food, instead of aiding the digestive process, it actually retards it by interfering with the action of the gastric juice. If, on the other hand, bile be administered, as the author proposes, at the end of stomachal digestion, it acts (as in the healthy organism)

on the chyme, and renders it fit for absorption. In order still further to insure this desirable object, Dr. Harley has had bile specially prepared and put up into capsules, which are not readily acted on by the gastric juice, but which, on being dissolved in the duodenum, allow the bile to come in contact with the food at the proper moment, and thereby enable the physician to imitate nature, and supply an important element to the system. The communication was well illustrated with preparations and drawings.—*Med. Times and Gaz.*, June 7, 1862.

26. *Treatment of Dysentery.*—In the acute form, and in the inflammatory stage, bloodletting, general and local, remarks Dr. Smart (*Climatol., etc., of Hong-Kong*), and the warm bath, are always the earliest means to be used. Everything should be done with a view to diminish the inflammatory impulse, to keep the muscular coat of the bowel at rest, and to determine to the surface, as long as the excretion is of mucus and blood, and, *à fortiori*, when it is of serum, blood-corpuscles, and lymph-flakes. Purgatives of any kind, especially calomel, which excites the discharge of bile into an already inflamed canal, can only have an injurious effect. Astringents, which tend to check the exosmotic action by which the inflamed capillaries are relieving themselves, are pernicious. Ipecacuan possesses of all known remedies the most relaxant power on mucous tissues, causing a kind of internal diaphoresis and checking the peristaltic action of the lower intestines, by nauseating and thus reversing that of the upper part of the canal, and by producing vomiting, by which the secretions poured in by the lower and the upper mucous glands are prevented passing through the large intestine. Opium, which calms the nervous excitement, deadens the pain and assists in moderating peristaltic action, is also invaluable. In this consists the merit of the treatment proposed by Surgeon Docker, of the Royal army, from his practice in the Mauritius, of giving large doses of ipecacuan combined with laudanum. In my practice I have found the most satisfactory results from this treatment, preceded by venesection and the warm bath. The recumbent posture and epithems to the abdomen, with absolute diet of rice or barley water, are most important adjuncts. When the tenesmus is lessened, and the passage of bile and feces shows the cessation of ileo-colic obstruction, a laxative of castor oil, with laudanum or oil of turpentine, will be useful; but after the second or third fecal stool, further action should be checked by opiates, administered by mouth, and in starch injection. As the symptoms moderate, the doses of ipecacuan are to be gradually diminished; and, at last, when bloody mucus has given way to opaque mucoid or muco-purulent discharges, some mild alterative, such as hydrar. cum cretâ, may be combined with the ipecacuanha.

This mode of treatment, as far as I have seen, cures more in the first stage, by resolution, than any other; but, even with it, absolute success must not be expected, as some cases will run to a fatal termination in the first stage, and others will progress to the second stage, with dense infiltration of the submucous tissue. This is known to have occurred when the pyrexia having abated, there remains a minor degree of tenesmus and tormina, with tenderness, accompanied by an altered state of the evacuations. Then, the modified treatment, by ipecacuan with alteratives, epispastics, and sometimes leeching over the tender points, and anodyne enemata, especially about midnight, is still most to be relied on. If breach of mucous surface has occurred, as indicated by renewal of mucus streaked with blood, and pultaceous or curded matter in the stools, the use of the vegetable tonics and astringents, as cinchona, quinia, and calomba, with occasional alterative laxatives, is to be had recourse to, and a broth, farinaceous diet, with a little port wine, may be allowed. If the symptoms be obstinate, the alternation of the mineral astringents, especially if there be passive hemorrhage, will be advisable. The terebinthinates will often be of great service in this stage; but should the urinary bladder partake of irritability they must be suspended. Unless the patient can be brought to feel that all injudicious ingesta are most detrimental to the diseased alimentary canal, any mode of treatment will be very unsatisfactory.—*Trans. Epidemiolog. Soc. of London*, May, 1861.

27. *Subnitrate of Bismuth in Diarrhœa and Chronic Dysentery.*—Subnitrate of bismuth is considered in the present day one of the best remedies in cases of

diarrhœa, and is employed with great advantage in the treatment of chronic dysentery. Under its influence the ulcerations cicatrize, the fetid gases are destroyed, and the excrements become black and lose their putrid character. But as the medicine requires to be taken in large doses, in order that it may exert a beneficial influence, some patients soon become disgusted with it, in spite of its insipidity. Dr. GAUBERT announces that he has found cream a very convenient recipient for its administration, especially in the case of young lymphatic subjects, who generally require tonics, and in whom the sensibility is often exaggerated. This preparation, due to Dr. Quesneville, has the advantage of presenting the subnitrate of bismuth in the form of a thick cream, which, on the addition of water, forms a milky fluid, without granular residue; and it will be readily comprehended that this state of minute division is highly favourable to its diffusion throughout the digestive canal, and consequently to the rapid obtaining of its therapeutic effects; so that smaller doses than ordinary are sufficient.—*Gazette Hebdom.*, 28 Feb. 1862, from *Gaz. Méd. de l'Algérie*, 25 Dec. 1861.

28. *Saccharine Treatment of Diabetes Mellitus.* By JOHN HUGHES, M. D.—The saccharine plan of treating diabetes originated, I believe, in France, and so far back as 1845. Bouchardat gave saccharine fruits in diabetes, and bread made from gluten. Andral and Piorry tried a similar treatment, with some success. And the practice has been recently adopted in England, by Dr. Budd, of Bristol, who has published some cases (two, I think) in which he says the most marked amendment followed the use of sugar. Others have also recorded cases; but they do not exhibit so favourable a result as those of Dr. Budd. It would appear, however, that some practitioners who tried this plan have found it beneficial. Their patients grew fat upon it; and even this effect, in a disease where wasting is so prominent a symptom, is a very desirable result. They say, besides, that the practice is not an irrational one; for Bernard has shown that sugar taken into the stomach, in its passage through the liver, is converted into an emulsive substance, which tends to fatten patients; and he has also proved experimentally, and Andral and others practically, that sugar is secreted and found in the circulation in diabetes, whether the individual be fed upon nitrogenous or amylaceous substances: consequently our old-established plan of dietetics in this disease, with all its restrictions, is useless.

Dr. Budd, one of its earliest advocates in England, says he gives sugar in diabetes on the principle of supplying to the system the particular element which is running to waste, and the loss of which appears to be the principal cause of the damage sustained by the constitution as the disease advances. On all these grounds, then, it has been considered that the saccharine treatment of diabetes is worthy of a trial.

Amongst the many theories propounded concerning this intractable disease, modern researches incline to the opinion that the liver is the organ in fault—an idea long since entertained by Dr. Prout. Experiments by Bernard and Pavey tend to show that there is always present in the liver, located in the hepatic cells in considerable abundance, a substance which one calls the "glucogenic matter" of the liver, the other "hepatine;" that this substance is, with great facility, by a process allied to fermentation, converted into sugar; but that it seems to have the power, whilst located in the tissues of the living and healthy liver, to resist the transformation. In certain unnatural conditions, however, as well as after death, this power is at an end, and the blood becomes surcharged with saccharine principle.

If this be true, it would appear that the diabetic condition depends upon some functional derangement of the liver, which converts alimentary substances into this glucogenic matter in greater abundance than natural, and allows it to mix with the blood in large quantity, when it immediately becomes converted into sugar, and as such passes off with the urine.

I am not sure, even assuming all this to be correct, whether we are in a better position to decide upon the exact nature of this disease. Probably, however, it is to physiology we shall have to look, in the end, for a solution of this difficult question; for pathology is strangely barren of results in this disease; so much so that it is doubtful whether the presence of sugar in the system either necessarily

depends upon, or produces, visible organic lesion of any particular organ. When organic diseases do exist, they are looked upon as merely concurrent affections.

However, it is not my intention to discuss the nature of diabetes mellitus: I merely wish to give a brief account of how this saccharine plan of treatment turned out in my hands, after a trial of more than four months.

Four cases of diabetes mellitus came under my care in hospital, almost simultaneously.

The first was a man named Thomas Ryan, aged 37, who had been diabetic for thirteen months before admission, and had been under treatment for his disease during the greater part of that time. On admission he was voiding, daily, eight pints of urine, specific gravity 1049, and containing 22 grains of sugar in each ounce. He complained of great thirst, languor, and debility; the skin and mucous membrane were dry; the bowels confined; and all the usual symptoms of diabetes were present.

I treated this man with Dover's powder and the vapour bath, for a fortnight, when he left the hospital relieved in respect to the condition of the skin and mucous membrane; his thirst was abated, and the skin was somewhat moist; the quantity of urine varied with the amount of fluid drank, but its condition was unaltered. He thought he was growing weak, and wished to go home. He told me his father had a complaint similar to his own.

This man returned on the 18th of January, and was then voiding ten pints of urine daily, of a specific gravity 1041, 24 grains of sugar in each ounce. He said he drank a large quantity of beer, one day, at home, and was not as well since. I now determined to put him on the saccharine treatment, and ordered him six ounces of barley sugar daily; diet of fresh meat, with green vegetables and bread: also a moderate quantity of lime-water and milk. He continued this plan steadily for three weeks; and at the end of that period his condition was, to a certain extent, improved. The quantity of urine passed was seven pints, the specific gravity 1041; each ounce contained 24 grains of sugar; and he gained two pounds in weight. The skin was somewhat moist, thirst abated. He was again anxious to return home, and left the hospital.

The second case was a man, aged 40; but as he was not in the hospital more than a week, and was treated with sudorifics (Dover's powder) alone, and almost an exclusively animal diet—I will only refer to his case. In fact, he would not submit to the abstinence from fluids, and the variety of food which I enjoined. He left without any apparent change. There was one fact connected with him of interest—he told us his father had the same ailment he was labouring under, and died of it.

The next patient was a man aged 32 (John O'Neill), who suffered from the complaint for 18 months before admission. On the 3d January he was voiding 15 pints of urine, of a specific gravity 1043, 18 grains of sugar to the ounce. He was very thin, and had all the symptoms of diabetes in an aggravated form. He was treated with sugar and a mixed diet, like the former patient; and at the end of six weeks his urine was reduced in quantity to six pints—the specific gravity remaining the same. All the other symptoms were greatly relieved, and he felt himself much better and stronger; in fact so well that he was anxious to go and resume his former employment (that of a shopman). Yet, on weighing him, we found he had lost four pounds in weight since his admission, and his urine contained 22 grains of sugar to the ounce. We heard that he since died of phthisis.

The last and most interesting case is that of Henry M'Nee. He was a married man, 30 years of age; tall, well-proportioned, and of a very athletic frame. He was always temperate; had no hereditary predisposition to the disease, and attributes his illness to profuse perspirations and alternate chills while working as a railway labourer. Five years ago, when employed in England, he first noticed his disease, and was treated for it at the Manchester Infirmary. After four months' stay in that institution, he left at his own request, relieved sufficiently to resume his work, at which he continued for 11 months before admission. At that time he noticed the aggravation of his disorder, which set in with great thirst, increased flow of urine, general weakness, and rapid loss of flesh.

On admission, all those symptoms had attained a great intensity. He said he was only the skeleton of his former self; for, when in health, he weighed more than 14 stone, and now he did not reach 12; which surprised him, when he could eat so much—four times his ordinary quantity—and he did not feel sick, only very weak. He was voiding 10 quarts of urine in 24 hours, of specific gravity 1049, and was obliged to empty the bladder every hour. He drinks about the same quantity of fluids within the same time. His urine has an acid reaction, is free from albumen, and each ounce contains 24 grains of sugar. As an evidence of his broken-down health we found a large, chronic, indolent ulcer over the right external ankle.

I was determined to give the saccharine treatment an uncomplicated trial in this case; and, after an aperient, I put the patient on six ounces of sugar, daily, together with four ounces of treacle; bread, meat, and green vegetables for diet; lime-water and milk for drink—with an injection to limit the amount as much as possible.

At the end of a month he was somewhat improved. He had gained two pounds in weight; his thirst and appetite were diminished; the quantity of urine passed in 24 hours was reduced from 10 to 7 quarts; the specific gravity ranged from 1043 to 1045—26 grains of sugar to the ounce.

During the next month he had two attacks of sudden and violent sickness of stomach, accompanied with constant vomiting and cramps in the abdomen and legs. He complained, for a few days, of great nausea, and felt as if saturated with sugar; everything, he said, tasted sweet. He was, at the same time, weak. The urine was of a specific gravity of 1044—not lessened in quantity. The ulcer of leg was healed. The sugar treatment was discontinued.

After the lapse of a few days the sugar was again resumed; and his condition, at the end of another month, was as follows: His weight, 12 stone 11 lbs.; consequently he had gained nine pounds since last report. His urine is reduced to three quarts in 24 hours; and he is not disturbed more than once or twice to pass it during the night. His skin is moist; his bowels are regular; he has gained strength, for he is able to work at the force-pump of the hospital for an hour without resting. The specific gravity of the urine is 1035–9, but it contains a *greater amount* of sugar than before. According to Garrod's glucometer each ounce contains 40 grains of sugar. His appetite and thirst have decreased; the ulcer of the leg has broken out again.

After four months' stay, he left the hospital in the month of May, and obtained employment as a porter, which obliged him to carry considerable weights; he remained at this work for six months, during which time I saw him occasionally; but at the end of that period he was completely prostrate, and sought relief in another hospital. As the sequel of his case has been published, I will add some extracts from the report:—

He was admitted into Dun's Hospital, under the care of Professor Law, in the month of January, and was then voiding 16 pints of urine in 24 hours—specific gravity 1042. On the 10th of February the quantity of urine was 12 pints—specific gravity 1035–9, and contained 8.750 grains of sugar, or about 45½ grains to an ounce. On the 8th of March the quantity of sugar was 39 grains to the ounce, the amount voided being the same. On the 20th March the quantity of sugar declined to 34 grains; and on the 8th May the urine was reduced to 10 pints; there were 38 grains of sugar in each ounce.

He left the hospital in July; but was again readmitted late in October, in an advanced stage of phthisis; and on the 10th November the *post-mortem* examination showed extensive tubercular disease in both lungs. "Both kidneys were very large; one weighed 12½ ounces, the other 11. Both were much congested, but exhibited no trace of disease or deviation from their normal structure. The liver was perfectly normal in size and appearance: and, on examination, did not contain a trace of sugar. It was, in fact, to the eye and to chemical analysis a specimen of a healthy liver."

It will be seen from these cases in which the saccharine treatment has had a pretty fair trial that, to say the least, it produced no permanent improvement. The specific gravity of the urine was not altered, and in each instance its saccharine quality was aggravated. 'Tis true the amount of urine voided within a

given period was considerably diminished; but I think that result is very much within the control of the patient, exclusive of medicine. I mean, of course, if he checks his desire for fluids. The gain in weight and the increased strength may be more justly attributed to other causes than to the amount of sugar taken; and I am quite satisfied, so far as my observation enables me to judge, that the saccharine treatment of diabetes is not entitled to the credit which its advocates claim for it. All that can be said for it is, that it is vastly agreeable to patients, and is not positively injurious, as one might *à priori* be inclined to suppose.—*Dublin Quarterly Journ. Med. Sc.*, May, 1862.

29. *Chorea treated by Sulphate of Aniline.*—Dr. Morell Mackenzie reports (*Medical Times and Gazette*, March 8, 1862) five cases of chorea treated in the London Hospital, under the care of Dr. Fraser, by the sulphate of aniline, and in all it failed to relieve the symptoms.

Dr. Thos. Skinner reports in the same journal, for March 15th, another case of failure of the sulphate of aniline to relieve chorea.

30. *Individual Remedies in Epilepsy.*—Dr. Anstie read a paper before the Medical Society of London (March 24, 1862), in which he gave the results of his own experience in the use of certain remedies in epilepsy. These were of two kinds—tonics and sedatives: of the former he had made careful experiments with cod-liver oil, quinine, and phosphorus, and also to a certain extent with iron; but of the effects of this last remedy he had not kept a tabulated record. Cod-liver oil was employed *alone* in twelve cases among the out-patients of Westminster Hospital and Chelsea Dispensary: the disease was in every instance of the simple or "idiopathic" kind; and the following results were obtained: Three complete failures (patients aged 14, 26, and 32, respectively; in all of them the disease was of long standing); one case in which the patient, a man, aged 44, derived no relief as far as regarded the fits, but his mental condition was improved; two cases (aged 10 and 12) which were improved, the fits being lessened in frequency, but the patients disappeared from the author's supervision while still by no means cured; and, finally, six cases, all still under observation, in which the fits have ceased entirely, and, so far as can be seen, the disease has been cured. Out of these six cases, two were sufficiently grave to put the efficacy of the remedy to a severe test; one of them was that of a girl, aged 17, epileptic from infancy, and in whom the fits had for some time past been happening two or three times every day; the effect upon the facial aspect and upon the intelligence of the patient had been very serious. Cod-liver oil was employed persistently for three months with the effect of inducing an entire cessation of the fits, and a most marked improvement in the intellectual and sensorial functions. The other case was that of a boy, aged 13, in whom the disease, which was hereditary, had come on six months previously. The fits were not very frequent, but were very severe; the memory was a good deal affected, and the shape of the head and the aspect of the face were far from encouraging. Nevertheless, a complete cessation of the fits soon followed the use of cod-liver oil. The remedy was persisted in for six months on account of occasional threatening symptoms; but even these have quite disappeared. The mental condition is much improved, and the boy may be pronounced cured, as far as we dare use that term at all. Quinine had been used singly in six cases: two of them had entirely resisted its influence (both these patients were women), a third had been very much benefited, the fits being much reduced in frequency, and an unpleasant numbness in the leg having disappeared. In the other three the improvement apparently amounted to cure. One of these cases, in which a very marked and peculiar aura was present, was minutely analyzed, and the influence of the quinine in stopping the aura, and altogether averting the paroxysms, was plainly shown. Doubtless local measures might have done much in this case, but they were intentionally and successfully dispensed with. All the cases treated by the author with quinine had been distinguished by the presence of some persistent local pain or numbness. Phosphorus had been tried by the author in only two cases of epilepsy, at the suggestion of his friend and colleague, Dr. Radcliffe, who has recommended its use in his book, as also that of cod-liver oil. The cases

were inveterate ones, in which cod-liver oil had failed to produce any effect. The phosphorus was given in doses of five to ten drops of the phosphoretted oil of the Prussian Pharmacopœia, three times a day. The fits were not lessened in frequency, but the general condition of the patients was much improved, and the miserable sense of nervous depression greatly relieved. Phosphorus ought to be extensively tried in epilepsy and in other nervous affections. With regard to iron, the author not having kept tabulated reports of its effects, was only able to confirm, in a general way, the popular belief in its great utility. He was in the habit of limiting its employment to cases distinguished by anæmia; and he related one or two instances of its usefulness when given in such cases. The author remarked that all these four tonics, cod-liver oil, steel, quinine, and phosphorus, were distinguished by the fact that they acted as *foods*, either to the nervous system, or the blood that nourishes that system. Looking at the success obtained by himself, and by other observers of larger experience, and also to the fact that the whole group of chronic convulsive diseases, of which epilepsy may be said to form the centre, are curable, if at all so, in nine cases out of ten by a nutrient-tonic regimen—the author urged that there was the greatest reason for extended experiments with remedies of this class, experiments which should be patiently persisted in for months together, no other medicines being used, except aperients when necessary. The sedatives of which the author had made particular trial were opium, hyoscyamus, belladonna, and sulphate of aniline. With regard to belladonna, he must state that he had not thought it right to push it to the extent of producing wide dilatation of the pupil for a long time together. He had administered it in doses of one-sixth grain of the extract twice or three times a day, a quantity which is usually sufficient to produce the minor effects of the drug, namely, relief of neuralgic pain, and resolution of muscular spasms; and in these doses the results were very equivocal, and by no means encouraging. With regard to the other three sedatives, the author regarded it as proved by his own experience, that in a considerable number of instances they possess the power of delaying the fit, or mitigating its severity; and for this purpose he was at present inclined to give the preference to the sulphate of aniline. This remedy he had tried repeatedly upon six epileptic patients, and also in many other cases of chronic convulsive disease. It was a most serious mistake to administer sulphate of aniline, or indeed any other sedative, in large doses, with a view to arrest or diminish convulsive muscular action. In the only two cases of epilepsy in which the author had pushed it to the extent of large doses, on account of the failure of small quantities, a serious aggravation of the fits occurred. In doses of one grain three times a day, with an additional grain to be taken immediately on the occurrence of any *prodromata* of a fit, sulphate of aniline seemed to materially benefit four patients to the extent of delaying or mitigating the paroxysm, and in three separate instances the fit seemed to have been altogether averted for a considerable time.

In conclusion, the author desired to state his conviction that future experiments with sedatives should be limited to the use of small doses only, and that they should be employed chiefly in the slighter cases of epilepsy which are not of long standing, or in those in which tonics and nutrition had already done much, but had not quite effected a cure. In short, wherever we could reasonably hope to effect good by the mere fact of breaking through the vicious habit, so to speak, of convulsion; then we might well try experiments with sedatives, and the results obtained by each observer should be numerically noted, and published.—*Med. Times and Gaz.*, April 5, 1862.

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31. *Statistical Inquiry into the Prevalence of Numerous Conditions affecting the Constitution in one thousand Phthisical Patients when in Health.*—Dr. EDWARD SMITH read a paper under this title to the Royal Medical and Chirurgical Society (March 25, 1862). After some preliminary remarks, the author described the method which was pursued in the inquiry, and offered an estimation of the trustworthiness and value of the answers which he had recorded. There were 600 male and 400 female cases, all attending at the Hospital for Consumption, and in the stages of marked consolidation or destruction of the lungs. He then quoted the scheme of inquiry proposed to each patient, con-

sisting of 138 queries, and the following is a summary of the facts obtained: The average age of the patients was 28.8 years. 30 per cent. had been born in London, 36 per cent. had lived chiefly in London, and 53 per cent. had lived in London during the preceding three years. 8.8 per cent. could not read nor write, and only 14.3 per cent. had been insufficiently nourished. 1. *Parental conditions.*—54 per cent. had lost the father; 46 per cent. the mother; and 28 per cent. had lost both parents. In 25 per cent. only were both parents living. The average age of the parents at death was 50.8 years, with an increased duration of 4.7 years on the part of the fathers. The most frequent age at death was 35 to 55 years; whilst only 11 per cent. died under the age of 35, and some lived upwards of 95 years. 18 per cent. had experienced feeble health before the birth of the patient, and 34 per cent. throughout life. In 22.7 per cent. one or both parents had led unsteady lives. 21.1 per cent. of the parents had died of consumption; whilst in 2.8 per cent. the grandparents, 23.3 per cent. the brothers or sisters, and 9.1 per cent. the uncles or aunts, had died of the same disease. They had suffered from rheumatism in 22 per cent., from asthma in 9.4 per cent., from liver disease and gout in 9 and 7.2 per cent., and from fevers, ague, insanity, and diabetes in 4 and 5 per cent. Presumed scrofulous affections were extremely rare. In only six cases was there consanguinity of the parents. The age of the parents at the birth of the patient was in half of the cases from 25 years to 35 years; and in only 2 per cent. was it less than 20 years. The number of the children was very large, viz., an average of 7.5 to a family, and in some families there were 23 children. The patient was the first child in 20 per cent.; and the first, second, or third child in half of all the cases. 40 per cent. of the parents' children had died. 2. *Personal conditions.*—In only 23 per cent. were the patients under 20, and a few were 60 years of age. 24 per cent. had been feeble at birth, whilst 22 per cent. had suffered from feeble general health and 17 per cent. from generally defective appetite. In 12.6 per cent. the lungs had been always delicate; 2.5 per cent. had been dry nursed; 25.4 per cent. had perspired with unusual freedom; 25 per cent. had never worn flannel next the skin; and 55 per cent. had suffered from coldness of the extremities. 72.5 per cent. had an excitable temperament; 62.1 per cent. had medium brown, or light-coloured hair; 74 per cent. had gray or blue eyes; 60 per cent. had florid complexions; and 46.7 per cent. had a fleshy habit. 16, 65.4, 60, and 41 per cent. had not had measles, scarlet fever, smallpox, and whooping-cough in their order; and the frequency of any long-continued ill-effects from these diseases was insignificant. 12.8 per cent. had suffered from enlarged glands, and 4.5 per cent. from long-continued affections of the eyes; but otherwise the evidences of scrofulous disease scarcely existed; 16.7 per cent. had suffered from inflammation of the lungs, and 14.8 per cent. from rheumatism; whilst typhus fever and frequent diarrhœa had occurred in 8 per cent., ague in 5.6 per cent., and liver disease in 4.3 per cent. of the cases. The menstrual epoch was at the age of 14 and 15 in 36.4 per cent., and in 11 per cent. only was it before the age of 13; 40 per cent. had complained of general irregularity, and in 29 per cent. the quantity was insufficient. Leucorrhœa was considerable in 42.2 per cent. 43.5 per cent. were married; and of these, 13 per cent. were childless at the period of inquiry. Their average age at the birth of their first child was from 20 to 25 years, and in only 9 per cent. were they under 20 years. The number of children per family was 1 and 2 in 44 per cent., and 1, 2, and 3 in 55 per cent. (the patients' average age was 28.8 years). 38 per cent. of the children had died, and in 43 per cent. the general state of the health of the children was bad. Abortions had occurred in 46.2 per cent. of the child-bearing married women, and some had suffered eight abortions. 11.6 per cent. of the males had committed sexual abuse; 18.2 per cent. had been addicted to masturbation, and 22 per cent. had suffered from involuntary emissions. 16 per cent. had syphilis, and 38.5 per cent. gonorrhœa; one on several occasions. 29.6 per cent. had led a bad life at some period, 24.5 per cent. had drunk to excess, and 48 per cent. had smoked tobacco; 19.3 per cent. of both sexes had submitted to late hours, and 22.2 per cent. had suffered much anxiety. In 70 per cent. there was some complaint as to the injurious influence of their occupations, and of those causes, exposure, long hours, close and hot rooms, bending postures, and dust or fumes,

were complained of in 32.1, 28.6, 24.4, 20, and 15.8 per cent. in their order. 9 per cent. had taken mercury largely, and 54.4 per cent. had been bled at the arm from 1 to 12 times. The author then considered some of the most important truths which the inquiry had evoked, and particularly the questions connected with hereditary transmission; the especial liability of the female sex to many of the conditions pointed out, and the state of the system; the diseases and the effects of the immoralities of life upon the patients. With regard to the greater liability of females over males, it was shown, in reference to parents, that more mothers than fathers who had children early, had feeble general health, and had died early. More female than male patients had mothers who died early; had most relatives who had died of phthisis; had parents with one child only; had experienced feeble health and defective appetite throughout life; had had delicacy of the lungs; had married when very young; had feeble children; had lost most children; had suffered from anxiety; had had measles, scarlet fever, and whooping-cough; had not worn flannel next the skin; had a very defective education; were of susceptible temperament; had brown eyes, florid complexion, and fleshy habit. and had suffered from coldness of the extremities.—*Medical Times and Gazette*, April 5, 1862.

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32. *Brass Founders' Ague; Disease produced by Fumes of Zinc.*—Dr. GREENHOW, in a paper read before the Royal Medical and Chirurgical Society (Feb. 11, 1862), stated that this disease had first fallen under his observation during a brief holiday visit to Birmingham in the autumn of 1858, and he had subsequently been able on several occasions to investigate its history and causes in Birmingham, Wolverhampton, Sheffield, and Leeds. The symptoms have, as the name implies, some resemblance to an imperfect paroxysm of ague; but they differ from it in this respect, that the paroxysms occur irregularly, and are distinctly traceable to exposure to the fumes of deflagrating zinc. The attack commences with *malaise*, a feeling of constriction or tightness of chest, sometimes accompanied by nausea. These always occur during the after-part of a day spent in the casting-shop, and are followed in the evening or at bed-time by shivering, sometimes succeeded by an indistinct hot stage, but always by profuse sweating. The sooner the latter follows the setting in of the cold stage, the shorter and milder is the attack, and the less likely is the caster to be incapacitated for work on the following day. Headache and vomiting frequently, but by no means always, accompany the attack, which at the worst is only ephemeral; but the attacks are sometimes of frequent occurrence. Persons who have but lately adopted the calling, or who only work at it occasionally, and regular brass founders who have been absent from work for a few days, are more liable to suffer from this disease than those who work at it continually. The men themselves attribute this disease to inhaling the fumes of deflagrating zinc, and there can be no doubt that their opinion is correct; for, on the one hand, several other classes of operatives are habitually exposed while at work to conditions exactly similar to those of the brass founders, except the liability to inhale the fumes of zinc, and yet do not suffer from this ailment; and, on the other hand, brass founders suffer from it in almost exact proportion to their liability to inhale these fumes. The results arrived at by the author of the paper are—1st. That brass founders, and, doubtless, other operatives exposed to the fumes of deflagrating zinc, are liable to suffer from symptoms resembling an irregular kind of intermittent fever. 2d. These symptoms consist of *malaise*, listlessness, aching of the limbs, nausea, headache, and shivering, with occasional vomiting, followed sometimes by febrile reaction, but always by profuse sweating. 3d. The severity and frequency of the attacks are much influenced by the regularity with which men work in the casting shops, those who work steadily at the occupation appearing to acquire a tolerance of the poison, which is, however, only temporary, seeing that after a few days' absence from work even the most seasoned casters are apt to have an attack of the metal ague on being again exposed to the fumes of deflagrating zinc. 4th. The severity and frequency of the attacks depend mainly upon the quantity of zinc fumes evolved into the atmosphere of the casting shops, those men who mix the metals, and especially those who use a large quantity of zinc in their castings, being much more liable to suffer than

those who merely re-melt brass bars, or make brass containing but a small proportion of zinc. 5th. Any cause which tends to retard the dispersion of the fumes into the atmosphere—such as a close ill-ventilated workshop, or foggy weather, or a high wind that beats back the fumes into the shop—increases the liability of the casters to suffer from metal ague. 6th. Although the cold stage is usually preceded by well-marked prodromata, slight causes, such as getting into a cold bed, or any trifling derangement of the health, are apt to excite a paroxysm of brass founders' ague in persons already predisposed to it by habitual exposure to the fumes of deflagrating zinc. 7th. Operatives, such as makers of galvanized iron-ware, who work over molten zinc below the temperature of deflagration, enjoy an entire immunity from this disease.—*Med. Times and Gaz.*, March 1, 1862.

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33. *Sudden Death from Emboli.*—A woman, 27 years of age, whose occupations compelled her to be constantly standing, had suffered for several years from large varices, which occupied the left saphena vein from the foot to the bend in the groin. At the end of November she was affected for the third time with inflammation of the saphena, and entered the Charité, under M. Briquet. The vein throughout its whole course and principal divisions was completely filled with coagulated blood, constituting large indurated cords, the skin covering them being red and thickened. By position, emollients, and similar means, the inflammation and fever were got under, and the patient was thinking of getting up in a few days, when on December 8, after an excellent night, she was seized by an undefinable sensation, and uttered a cry of alarm. She was found to be extremely pale, her features having undergone marked changes. Her arms were convulsively moved, she complained of intense pain in the chest, and in a state of the greatest alarm declared she should be suffocated. The pulse was filiform, the heart beat tumultuously, but without abnormal sound, and she died at the end of twenty minutes. The external saphena, as well as its principal divisions, was filled by a hard, blackish coagulum, which adhered to the reddened walls of the vein, and extended as far as the commencement of the left iliac vein. The deep saphena was free, and the blood it contained was quite fluid. The iliac vein and the vena cava were quite free from obstruction, and nothing abnormal was found in the heart or its cavities. But when the pulmonary artery was opened, a coagulum was found folded back upon itself, and occupying all the space between the sigmoid valves and the bifurcation of the artery. The coagulum was quite free within the artery, and the walls of this vessel, as well as all the endocardium, were perfectly white and polished. The coagulum, fifteen centimetres long, was of a much less diameter than that of the artery, its calibre being that, in fact, of the iliac vein. It in nowise resembled the concretions which are sometimes found in the pulmonary artery, being red and very hard, and consisting internally of coagulated fibrine. The lungs were pale, and almost bloodless; and there were no other appreciable morbid changes. The deep veins of the leg and thigh were of normal volume and appearance, and contained only fluid blood. There can be no doubt, M. Briquet observes, that a coagulum detached from that which filled the femoral vein, was carried into the iliac vein under the influence of the ascending venous current. Remaining movable and unattached to the walls of the iliac vein, when the patient was placed in the horizontal posture it entered the heart, and thence the pulmonary artery, when applied against the arterial bifurcation, it simultaneously arrested circulation and respiration, and gave rise to sudden death by syncope and asphyxia.—*Med. T. and Gaz.*, March 22, 1862, from *Gaz. des Hôp.*, No. 25.

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34. *Case of Syphilitic Disease appearing in two Healthy Children after Vaccination from a Syphilitic Child.*—Dr. N. J. Haydon relates (*Med. Times and Gaz.*, March 29, 1862) the following examples of this, which are interesting as bearing upon the question now in dispute as to the possibility of syphilis being communicated with the vaccine virus:—

"In the summer of 1843 I was called, as the medical officer having charge of the sick poor of the parish and borough of Bodmin, Cornwall, to attend two young children of different families, and living about a quarter of a mile distant

from each other. The children were each of them from nine to ten months old. The history of their illness being precisely similar, one description will apply to both. On the first introduction of the compulsory vaccination system, the guardians of the Bodmin Union entered into a contract with one medical man to perform the vaccinations for the whole Union. This gentleman, in the discharge of his duty of public vaccinator, attended at the appointed room in Bodmin, and on that particular day vaccinated those two children, taking lymph from the arm of a child he had vaccinated the preceding week; he appeared (from the most careful personal investigation which I made of this matter at the time) to have vaccinated no other than those two children on the day in question, and to have taken lymph from no other child, but the particular one alluded to. Between the second and third week after the vaccination had been performed, I first saw the children. They were literally covered with large phlyzacious pustules, the irritation was most intense, and, between rubbing and scratching, the head and nates were raw and ulcerated. No treatment had any avail, and both these poor children died a few days after I first saw them. Being at once impressed that the disease of these children was syphilitic, I made the most careful investigation I could into the whole matter. In both families there were other older children perfectly healthy. The parents, in both cases, were labourers, of most healthy appearance, and of good character; were then, most certainly, and I have no cause to doubt ever had been, free from syphilitic taint. The respective mothers of both children carried their infants themselves to be vaccinated; they saw the operation performed, and they saw the child from whom the lymph was taken; they told me the name of the child, and where it lived. As medical officer of the borough of Bodmin, this child and its mother were both known to me. The mother had been, and, in fact, then was, on the town, and I had attended her for syphilis. At that very time she was diseased. I examined her child; it had, as far as I could see, no primary syphilitic sores, but it had numerous syphilitic eruptions about its body, pustules about its nates and trunk, and copper-coloured leprous spots. The child was between two and three years old, and under treatment it recovered. The public vaccinator lived at a distance from Bodmin, and could not have known the character of the parties from whom he took the lymph."

35. *Value of Ægophony as a Sign of Pleurisy.*—Laennec considered ægophony as a pathognomonic sign of pleuritic effusion. Skoda was the first to call in question this, but it remained to Prof. LANDOUZY to show that ægophony is due not to the fluid, but only to the modifications produced in the lung by the fluid. In a work published some years ago, he said, "Ægophony is only a variety of bronchophony: it is dependent upon the modification impressed upon the lung by the effusion, but not upon the fluid itself." The professor now publishes two additional cases, which, though at first sight contradictory, demonstrate the real conditions upon which ægophony depends.

The following are Prof. L.'s conclusions:—

1. Ægophony indicates compression of the lung, either by a fluid effusion in the pleura, or by a layer of false membrane without actual effusion.

2. In the absence of resisting false membranes, ægophony disappears or diminishes on the removal of the effusion.

3. When false membranes are present, ægophony increases immediately after thoracentesis, but diminishes gradually with the yielding of the membranes.—*Ed. Med. Journ.*, April, 1862, from *Archives Générales*, December, 1861.

36. *Tænia Solium.*—M. MAUCHE has observed twenty cases of *tænia solium* among the soldiers of the 16th battalion infantry chasseurs, recently returned from Syria. Most of the patients have expelled slender portions of the parasite, with or without the head, armed with three hooks, the distinctive character of the *T. solium.* One patient only passed two whole worms. The kousso succeeded almost always when the three following precautions were taken: 1st, that fragments of the worm should have been passed shortly before commencing the use of the medicine; 2d, that the kousso is prepared the day it is to be taken; 3d, that the patient observes a rigid diet for from 12 to 24 hours pre-

viously to taking the medicine. The decorticated fresh seeds of the pumpkin rubbed up with sugar were used in some cases. This remedy was longer in expelling the worm and less effectual. It generally did not expel the worm earlier than 24 to 30 hours. The anthelmintic opiate composed of 125 grammes of honey and 20 grammes of turpentine also was useful, but it was less certain than the kousso.—*Journ. Hebdom.*, 24 March, 1862, from *Recueil de Mém. de Méd. de Chirurg. et de Pharm. Milit.*, tom. vii. 3d serie.

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37. *On the Probabilities of the Duration of Life in the Apoplectic and the Phthisical.*—Dr. Bruckner has collected materials for determining statistically the probabilities of life in the apoplectic and phthisical.

The results of his observations in the case of persons threatened with apoplexy are the following: Fatal cases of apoplexy are on the increase; therefore the danger in our day is greater than it was in the last century. Hamburg appears to be the most dangerous residence for such persons; London is safer; mountainous countries are the safest. The country is less dangerous than towns. Winter is the most dangerous period for these persons; spring and autumn are less dangerous; summer is the safest. The first year of life presents the greatest danger from this cause; it goes on diminishing till the tenth year, and increases rapidly from fifteen to twenty. From this time it increases more slowly up to forty years, when it increases rapidly. About the sixtieth year the greatest increase of danger takes place; it only increases slowly from this time to seventy-five. From this age, the danger of apoplexy gradually diminishes. The years 48, 58, 66, are peculiarly dangerous. On the other hand, there is little danger of dying of apoplexy in the years 46 and 49. The male sex is (with the exception of London) generally more exposed to apoplexy than the female, particularly between the ages of thirty and fifty; whilst up to twenty, and then after sixty, there is proportionally more danger for the female sex. During the middle and earlier years of life, the well-to-do classes are in greater danger of apoplexy than the population in general. Where intermittent or pituitary fevers prevail, the danger appears to be greater. Sudden change of weather appears to increase the danger, as also does rain, whilst fogs (London) do not appear to have this effect.

With regard to the probabilities of being attacked with and dying of phthisis, Dr. Brückner's inquiries give the following results: The danger of death from phthisis is not so great at present as it was in former times. The female sex is in greater danger of phthisis than the male: London and Berlin are exceptions. This is particularly the case in youth, and up to the fortieth year; whilst in later life the danger diminishes more rapidly in the female sex than in the male. Persons who, from the nature of their employment, are exposed to the inhalation of dust, especially of mineral particles, are in great danger. Those who freely employ the organs of voice, or the muscles of the chest, particularly in the open air, are exposed to the least danger. Phthisis appears to be most frequent in the two temperate zones. In countries where inflammatory affections of the chest are endemic, the danger of phthisis is inconsiderable: these diseases, when endemic, exclude one another. In countries where intermittent fever is endemic, the danger of consumption is great: these diseases do not exclude one another. At a height of 1800 to 3000 feet above the sea (in dry mountain air), the danger of becoming phthisical is slight; in low marshy districts, on the other hand, the danger is great.

With regard to the probable duration of life of such persons as are doomed to die of phthisis, Dr. Brückner has deduced from his statistical investigations the following conclusions: In a person of phthisical constitution, the danger of becoming affected with consumption increases up to the twentieth year, when it has reached its highest point. The danger may be reckoned as equal to 21.05 years of life, so that such a person at the age of 23 years has the same expectancy of life as a healthy individual at 44. From the thirtieth year, when it may be reckoned as equivalent to 17.42 years of life, the danger goes on diminishing. In the fortieth year it is equal to 13.94 years, in the fiftieth to 7.23 only. In the seventieth year the danger is at an end, a person of a phthisical constitution

having the same prospects of life as any other individual of that age. Under similar circumstances, phthisical persons of the female sex die more rapidly and at an earlier age than males. The female sex reaches some years earlier than the male its highest point of mortality from phthisis.

If a person is actually affected with phthisis, his probable duration of life is 21 months and 9 days. A pregnant woman, during the duration of her pregnancy, is not likely to die of phthisis. After delivery, a consumptive woman has probably not more than six weeks to live. For all phthisical persons, the danger of dying is considerably greater in spring, less in summer and winter, and least of all late in summer, towards autumn. If a phthisical person removes from a warm to a cold climate, the danger of death is thereby greatly increased. —*Edin. Med. Journ.*, Jan. 1862, from *Canstatt's Jahresbericht*, 1861.

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

38. *Treatment of Burns.* By Prof. ROSER.—In truth, there can scarcely be said to be any special treatment of burns, the loss of substance resulting from their influence being repaired by the same processes as prevail after any other form of destruction of the cutaneous surface. Much depends upon the depth to which the injury has extended, for while a destroyed epidermis is rapidly reproduced, when the skin has suffered to a great depth, or throughout its entire substance, the reparation, after the separation of the mortified parts, may be very tedious, in consequence of the great loss of substance, or of the unsuitable character of the parts affected for cicatricial formation. The contraction after cicatrization is also often great, both from this loss of substance and from the position of the parts, as in the bend of the limbs, being favourable to such contractile action. It is, however, an error to suppose that greater contraction follows burns than takes place from similar loss of substance from other causes. When the skin has been destroyed only through a portion of its substance, this contraction is not observed, only smooth cicatrices analogous to those of smallpox being present.

Not only is the period required for reparation and cicatrization after burns dependent upon the depth to which the injury has extended, but it is still more so on the inflammation of the skin which it has given rise to. This may affect not only the part actually burnt, but the adjoining parts, and may give rise to a secondary destruction of the skin, or at all events obstinate suppuration, which will delay the healing process, this then assuming a remarkably chronic character. Although it is this last circumstance which by its complexity and its consequences chiefly renders our prognosis uncertain, yet the other point, the determination of the depth to which the burn has extended, is by no means always an easy matter at first, even for the most experienced observer.

When the epidermis is merely lost or raised up into bullæ, the treatment of burns is simple enough. The serum should be discharged from the bladders by small punctures, without removing the epidermis. The necessity of covering the exposed nervous papillæ explains the success of various empirical applications; and even the solution of nitrate of silver acts only in this way. The exposed cutis becomes covered with a thin layer of gelatinizing albumen, and the deposit which ensues upon the application of the nitrate solution produces a protective crust. Lead and chalk waters act in the same way, and cotton wool, the most suitable and simplest of all dressings, thus protects the exposed parts from the action of oxygen, and from mechanical contacts.

After two or three days, the physiological condition of the parts is different, the exposed papillæ having, in consequence of a growth of cells and vessels, become covered with a protective covering. The excessive sensibility has diminished, suppuration may have occurred, and perhaps here and there, deeper penetrating inflammatory action has been set up. We have now to seek whether

we can moderate this inflammatory action, and favour the formation of epidermis. But, in fact, we can do little in the matter. If the injury is superficial, the healing will soon take place, under the use of the most different and sometimes absurd means; while if the inflammation has penetrated deeply, do what we will, the cure will be slower. We may resort, according to circumstances, to various local antiphlogistic applications. When the mortification of the skin is only superficial, it is quickly thrown off, leaving a retiform granulating surface, and art has here little to do beyond protecting the parts from injury. When the mortification extends deeper, we have no specific means for hastening the suppuration of parts which must precede separation. Such separation is a physiological process, and our intervention is limited to the prevention of its being obstructed. But the separation having taken place, have we any means of hastening the growth of granulations or of repressing them when too luxurious? Physiology and clinical experience alike declare that nothing need be done. The granulations, if too prominent, will afterwards recede without the aid of caustic; and the smoothest cicatrices will be found in those cases in which least interference has taken place. When, however, the wound is advancing towards cicatrization, the condensation of the connective-tissue, and its covering with epidermis, are much favoured by a protective covering of adhesive plaster.

In the extremest degree of burns, when the skin is destroyed throughout its entire substance, we have to do with a condition of great surgical importance, cicatricial contraction, which although of the highest utility in lessening the surface of the wound in some cases, proves in others of the most serious detriment. The employment of adhesive plaster is of great service in regulating this contractile power of the cicatrix. Thus, suppose a longitudinal loss of substance on the anterior surface of the index finger exists, there is no better means of regulating the direction of the cicatrix which will ensue, than surrounding the whole finger by small strips of plaster. These act in three ways. 1. The circular application displaces the skin from left to right, and favours the formation of the cicatrix in the transverse direction, in which no contraction can occur. 2. Contraction in the longitudinal direction is also prevented by the finger being kept stiffly bound up, so that its flexure is difficult. 3. The plaster exerts a very decided influence in preventing or remedying that projection of the cicatrix, which is so remarkable after longitudinal loss of substance at the bend of joints and in the neck. In the same manner, in the most various parts of the body, we may obtain from the use of plaster beneficial effects which no other means will furnish. So also the contractions supervening on burns which have been improperly treated, are so easily, rapidly, and completely remedied by the methodical application of plaster, that the cases must be seen to obtain belief. Most aggravated cases, which those unacquainted with this simpler means would suppose to be amenable only to the knife, and others for which this has been in vain resorted to, have readily yielded to the application of plaster. It was Mr. Tamplin who first drew attention to this mode of treatment, and Professor Roser's experience has amply confirmed the truth of his statements. He has been quite astonished at the success which attends the treatment of the worst cases of contraction of the fingers. The plan consists essentially in surrounding the part with small strips of plaster, and making counter-pressure at the contracted flexures by means of small balls of cotton wool.—*Brit. and For. Med.-Chirurg. Review*, April, 1862, from *Archiv. der Heilkunde*, No. 1, 1862.

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39. *Traumatic Tetanus cured by Chloride of Barium.*—Dr. Gnecchi, of Milan, relates the following example of this:—

A hairdresser, thirty-nine years of age, cut himself in the palm of the left hand, about the beginning of March, 1858. The wound healed in six days, and there was no bad consequence until the morning of the 30th of March, when, on getting out of bed, he began to feel a difficulty in opening the mouth, a contraction of the left hand with impossibility of extending it, with pain in the right flank and thigh. For the first few days these symptoms disappeared when the patient lay down in bed, but returned when he got up and exposed himself to the air. On the 10th of April, as the symptoms were increasing in severity, the

patient was admitted into the principal hospital of Milan. Next morning there was spasmodic contraction of the masseters, with rigidity of the muscles of the neck; the left hand contracted as soon as the arm was removed from below the clothes, while the pain in the flank and thigh persisted. The pulse was but little increased in frequency. Chloride of barium was prescribed in the form of sixteen grains of the salt in a pound of distilled water, to be taken in the course of the twenty-four hours. This dose was continued till the 31st, when, as the tetanic symptoms had almost disappeared, it was reduced to eight grains. The medicine was discontinued after the 26th April, and on the 28th the patient was dismissed cured.

In connection with this case, it may be stated that Dr. Gnecchi has since succeeded several times in curing traumatic tetanus with this preparation of barium, that Dr. Gherini failed, but that Dr. Tassani succeeded in the case of a man wounded in the Italian war.—*Ed. Med. Journ.*, April, 1862, from *Gazette Med. Ital. Comb.*, and *Gaz. des Hôp.*

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40. *The Influence upon the Growth of the Bones of Paralysis, Disease of the Joints, Disease of the Epiphysial Lines, Excision of the Knee, Rickets, and some other Morbid Conditions.*—Dr. G. M. HUMPHRY read a paper under the above title before the Royal Medical and Chirurgical Society (April 8, 1862). It consisted chiefly of the account and measurements of numerous cases and specimens, and the following are the principal conclusions: Paralysis is usually attended with a deficiency in the growth of all the bones of the part affected; this is most marked in the segments where the paralysis is most complete. Its effect, however, is very irregular. Disease of an important joint, causing anchylosis or preventing movement in the joint, is often attended with imperfect growth throughout the limb, most marked, however, in the segments contiguous to the diseased joint. It is probable that anchylosis of the hip, in childhood, may induce deficiency of growth on that side of the pelvis, and so be a cause, in the female, of difficult parturition. The author has not, however, been able to substantiate that point, and would be obliged by information bearing on the question. Disease in the epiphysial lines of bones deserves more attention than has usually been given to it. It is often, though not always, followed by impairment of the growth of the bone affected, and sometimes of the whole limb. It is most frequent and most deleterious at the lower end of the femur, where the growing process is more active and longer continued than in any other part of the body. In a segment of a limb where there are two long bones, as the forearm or leg, and one of them is stunted by disease, the other commonly is so too, but not necessarily. Thus the fibula sometimes outgrows the tibia, and runs below, or ascends above, its proper level with regard to it. Excision of the knee, if the epiphysial lines are removed, is followed by marked arrest of growth in all parts of the limb. If the epiphysial lines are spared, the growth, in most instances, keeps pace with that of the opposite limb. In some cases this is not so, owing, perhaps, to the effect of the preceding disease upon the limb, or to the epiphysial lines becoming involved and destroyed in the suppurative processes that follow the operation. Hence the proper growth of the limb, after excision, cannot be calculated on with certainty in any particular case. Still the short limb, even when there is a considerable difference between it and its fellow, is commonly so useful that the fear of arresting the growth of the limb is not a fatal objection to the operation in young subjects; and, after the age of fifteen or sixteen, it need scarcely to be taken into account. Rickets is characterized by a want of proper growth in bones, even more decidedly and more uniformly than by preternatural curvatures in them. The imperfection is commonly noticeable, more or less, in all parts of the skeleton; but is most marked in the limbs, and most of all in the proximal segments of the limbs. These segments of the limbs—*i. e.*, the thigh and the arm, grow more quickly after birth than other parts of the body; and the want of growing power attendant on rickets tells accordingly in a peculiar manner upon them. A bulging and knottiness at the epiphysial lines is a common feature in rickets, and is apt to be mistaken for swelling of the ends of the bones, which is very rare, except in the intra-uterine and infantile periods. This bulging is due to the calcification

of the epiphysial stratum of cartilage not taking place in a proper manner, so that the part yields, or is squeezed out, and then undergoes ossification. The condition is most frequently observed at the lower end of the femur and at the upper end of the humerus.—*Med. Times and Gaz.*, April 19, 1862.

41. *Ligature of the Common Carotid.*—Dr. Redfern Davis, of Birmingham, communicated to the Medico-Chirurgical Society of Edinburgh the following case:—

"About two years ago I was sent for during the night by a physician, to see a man, who, in a paroxysm of jealousy, had just cut his throat with a pocket-knife.

"When I arrived, I found the patient lying on a bed, whither he had been removed. On the floor of the room was a large quantity of blood, and the bed-clothes were sprinkled with the same fluid. The man, who, from loss of blood, was very pale and feeble, presented on the left side of the neck, just below the angle of the jaw, a rugged, transverse incision of about two inches in length. The windpipe and gullet were uninjured. For about half an hour I vainly strove to discover the source of hemorrhage, succeeding only in finding some two or three small arteries, which I ligatured, but without materially, if at all, lessening the flow of blood.

"Finding that the man was gradually getting weaker, and that by compressing the common carotid artery the hemorrhage was completely stopped, I determined to tie that vessel.

"I had previously made up my mind that, should a case occur where I was called upon to tie the artery, and should the place of selection be left to my own choice, I should ligature it in the cellular interval between the two heads of origin of the sterno-mastoid, as originally proposed by a French surgeon. Accordingly I did so, and found the procedure very easy, although certainly some difficulty was occasioned by the deficiency of light, one farthing candle being all I could procure. I interfered as little as possible with the cellular sheath of the artery. The artery was tied with a hempen ligature, as I feared to employ a metallic one, in case, if any accident should occur, it might be ascribed to its use. I had not at that time so much confidence in metallic ligatures as, from their constant employment, I have since acquired, or I should not have hesitated to use a silver wire, as I did some months ago in tying the popliteal artery, and as I am always in the habit of doing in cases of amputation. After the artery was tied, the bleeding entirely ceased; and the wound having been dressed, the patient fell asleep, and continued sleeping till nearly the middle of the following day. As a precaution, however, I left my own dresser to remain in the house.

"The ligature came away on the twenty-first day, the wounds healed up entirely a few days afterwards, and my patient resumed his duties, which were very light, in two months from the receipt of the injury.

"During the whole time nourishing diet was prescribed, but no wine, spirits, or malt liquor was allowed.

"The feature in this operation to which I would especially draw the attention of the society is the position where the common carotid was tied—a position which I think presents the following advantages over the situations where it is usually ligatured:—

"1. The superficial position of the artery, enabling the surgeon to come directly upon it.

"2. The muscles, not requiring to be turned aside, are in no way disturbed. Though this makes little difference at the time of the operation, it subsequently aids the free escape of pus.

"I am aware that an objection may be raised on account of the position of the jugular vein; but it must be remembered that in the above case, in consequence of the previous loss of blood, the size of that vessel was very much diminished, and it therefore was not calculated to occasion that amount of inconvenience which it otherwise might have done. During the operation I never saw it; and had it been troublesome, it would have been very easy to have restrained its swelling by means of the fingers of the left hand, according to the

procedure recommended in tying the common carotid artery."—*Edinb. Med. Journ.*, January, 1862.

42. *Operations for the Cure of Varicocele and Varicose Veins.*—Dr. M. H. COLLIS, in an interesting "retrospect of the progress of surgery during the last decade," makes the following remarks on this subject:—

"Operations for the cure of varicocele and varicose veins are at present in great repute in France and England. The simplest and least dangerous of these are Vidal de Casis', Lee's, Erichsen's, Startin's, Ricord's, and Tufnell's methods.

"Vidal inserts a pin behind the veins, and a wire in front of them, but through the same apertures in the skin; the wire is passed through holes in either end of the pin, and the two being twisted, the veins are compressed and gradually cut through.

"Lee[1] passes two needles under the veins, and applies the twisted suture for a few days, until the vein is filled with a coagulum between the sutures; he then divides the vein subcutaneously.

"Erichsen[2] substitutes, for Vidal's bar and wire, a simple loop of wire, which he gradually twists until it cuts its way out.

"Startin[3] uses what he terms a bar-needle and clasp, which are convenient for many operations besides those on varicose veins. The bar-needle has a straight shaft and a curved extremity; the latter enables the operator to pass it readily under the vein, the former enables it to compress the vein when passed through. The clamp is a piece of wire with a loop at either end, which acts as the thread in the figure of eight suture.

"Ricord makes use of two loops of hempen thread which are passed in opposite directions—one over and the other under the veins; the ends of each ligature are then passed through the loop of the other ligature, and drawn tight.

"Mr. Redfern Davies[4] and Mr. Tufnell[5] substitute wire loops for thread; and the latter surgeon adds what he calls 'retracting guides.' These are simply threads of wire which are attached to each loop, and which enable the surgeon to lessen his compression of the vein whenever he pleases, or to remove the ligature entirely.

"Mr. Davies found it impossible to remove the wire ligatures, in one instance, and was obliged to cut them close off, and leave them in the man's scrotum, where they appear to have permanently remained without the patient being incommoded by, or even conscious of, their presence.

"All these modifications of metallic ligature are preferable to incision, excision, or caustic, though none of them are free from danger. In operations on varicose veins in the leg, it is advisable to place a pad on the vein above and below the point operated on, so that blood may not lodge there. There is no greater cause of troublesome and dangerous phlebitis than the presence of coagula in the veins. The danger may be reduced materially by the use of compresses; but in no case can operations on veins be considered other than uncertain and dangerous. In varicocele the use of elastic compresses and suspensories, cold douching early and late, and abstinence from the general exciting cause will cure many bad cases, and that with a surprising rapidity. The use of bromide of potassium (if it can be obtained pure) as an antaphrodisiac, in combination with iron, if necessary, is a useful adjunct; and everything should be tried before risking the patient's life by operation.

"If the mortality were not more than one per cent. we should not be justified in letting our patient run even that small risk until all other means had failed. In varicose veins of the leg, the most perfect obliteration will not always cure the ulcers which have called for the operation; and if we knew but all, relapses will be found to occur after ligature of the spermatic veins, not to speak of the

[1] Medical Times and Gazette, January, 1853, &c.
[2] British Medical Journal, February, 1860.
[3] Medical Times and Gazette, May, 1860.
[4] Lancet, July 20, 1861.
[5] Dublin Quarterly Journal, November, 1861.

possible atrophy of the testis, for which our patient would not thank us. For the leg, a broad band of vulcanized India rubber tightly encircling the limb below the knee, as recommended by Professor Hargrave, will sometimes effectually compress the superficial veins, and drive the blood into the deeper channels, especially in thin subjects, and the plan is unattended with risk, and may fairly claim a trial."—*Dublin Quarterly Journ. Med. Sc.*, May, 1861.

43. *Stability of the Cure of Varices.*—M. Blot communicated to the Society of Surgery two cases of the spontaneous cure of large varices occurring in pregnant women. They were seven months advanced, and although the tumours formed by the veins were large, hard, and red, these entirely disappeared by means of mere rest, cataplasms, and the use of an inclined plane. They returned neither before nor after delivery. M. Chassaignac doubted the propriety of the term radical cure applied to these cases by M. Blot; for how often do we find the blood resuming its course in veins which had been temporarily obliterated by inflammation. The coagula produced by coagulating substances do not either assure a definitive cure of varices, as they always become absorbed. M. Chassaignac is even sceptical with respect to the radical cure of hydrocele by means of irritating injections; for he has found the fluid reproduced in the tunica vaginalis, although this at first had been completely obliterated, and had abundantly suppurated. M. Velpeau declares that relapse after the operation for hydrocele did not take place oftener than in four per cent., whether there had been obliteration of the tunica-vaginalis or not, such obliteration, especially definitive, being, indeed, very rare. With respect to the radical cure of varices he is more disposed to agree with M. Chassaignac, inasmuch as the obliteration of the veins, whether produced by the perchloride of iron, caustics, or ligature, and which is often so difficult to effect, is not after all durable. The varices are reproduced. Such reproduction may take place even after excision of the varicose veins; for M. Velpeau has seen the saphena vein reproduced ten years after such an operation. This M. Broca regards as an illusion on the part of M. Velpeau, for, as M. Verneuil has shown, in the great majority of cases, this large vein which is taken for the saphena is not that vein, but a varicose collateral, taking the same direction as the saphena. With respect to the stability of the obliteration of the veins, we should distinguish whether this has been produced by means of coagula or by adhesion of the walls of the vein. Coagula will disappear at last, even those which have been produced by means of an injection of the perchloride; and in one case M. Broca has known this to take place at the end of five years. But when the obliteration is due to the adhesion of the walls of the vessel, such adhesion is as solid, or even more so, than that which takes place between the pleuræ. M. Dépaul does not regard a relapse as always a proof that a radical cure has not taken place. A man fractures his leg at the seat of a well-formed callus, but surely we should not deny that the original fracture had been completely cured. With respect to M. Blot's two cases, although they certainly are examples in which the varices were cured prior to delivery, they would have been of more value as examples of radical cure had they not occurred in the persons of pregnant women, in whom varices habitually disappear at the termination of pregnancy. M. Dépaul added the observation that the production of varices in pregnant women is not solely due to a mechanical cause, for these varices sometimes appear long before the uterus has attained a size sufficient to compress the pelvic vessels. There is therefore also some special cause, the nature of which is as yet unknown.—*Gazette Hebdomadaire de Med. et de Chirurg.*, 18 April, 1862.

44. *True Anchylosis of the Left Hip-Joint, from Rheumatism; the limb at a right angle to the body, and abducted; excision of a wedge-shaped piece of the femur; cure.*—Dr. H. W. Berend, of Berlin, recently (21 April, 1862) communicated to the Academy of Sciences, through M. Velpeau, a case of this. The condition of the patient was such as to render impossible the usual orthopedic method of treatment. Myotomy would have been useless, and violent extension would have subjected the patient to the danger of a serious fracture

of the pelvis. M. B. therefore determined to perform Barton's operation, which he did as follows:—

The patient having been put under the influence of chloroform, was laid on his right side. An incision down to the bone was then made three inches long, commencing a little above the great trochanter, and extending transversely and outwardly, regarding the anomalous position of the limb, it being in a state of abduction and flexed to a right angle. The bone was then denuded and divided by a Charriere's saw and the knife saw, which Dr. B. prefers to the chain saw on account of the difficulty of inserting this last between the bone and the soft parts. A cuneiform portion of bone was removed, the base of which was three-quarters of an inch. No hemorrhage followed the operation. The wound was united by silk and silver ligatures; and compressing bandages were applied to prevent hemorrhage.

During the first six days the patient had moderate fever, and he was kept upon an antiphlogistic diet. On the sixth day the ligatures were withdrawn. After this nothing remarkable occurred except frequently recurring erysipelas of the thigh operated on, dependent upon protracted fetid suppuration from the bottom of the wound. This was successfully treated by the prolonged use of cataplasms and a small incision at the anterior portion of the thigh.

Nine months after the operation Dr. B. commenced certain gymnastic movements, with a view of maintaining the mobility of the false articulation, and at the same time to strengthen the limb.

Eleven months after the operation the patient was entirely cured, and was exhibited to many societies of Berlin. The deformity had disappeared, and the patient could take the longest walk without any other support than a small stick and without limping.—*Gazette Hebdomadaire*, May 2, 1862.

This operation, first performed by Dr. J. Rhea Barton, of Philadelphia, has since been practised by the late Dr. J. Kearney Rogers, of New York, and also by Maisonneuve in France, by Ross in Holstein, by Textor and Waller in Germany, and now by Berend.

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45. *Dislocation of the Ulna forwards without Fracture of the Olecranon.*—It has generally been supposed that dislocation of the ulna forwards cannot take place without fracture of the olecranon. This idea, however, it is observed by the editor of the article "Dislocation," in the new edition of *Cooper's Surgical Dictionary*, "is doubly incorrect; inasmuch as there are at least six well authenticated cases of the dislocation *without* the fracture, and only three published cases in which the two were combined." To the cases of dislocation without fracture of the olecranon must be added a case related before the Société de Chirurgie in Paris on July 31st.

On April 19th, a lad, aged 15, had his arm and hand caught in a mill. The hand was slightly lacerated; the forearm was broken at the middle; there was not much swelling of the elbow, and a luxation forwards was readily detected. The back part of the elbow was flattened; the processes of the lower end of the humerus, especially the epitrochlea, projected considerably; the forearm was half bent, and could be extended and flexed, but with great pain; the olecranon could be distinctly felt in front of the elbow. M. CAUSSIN, in whose care the case was, attempted to reduce the dislocation by extension. Failing in this, on account (as he supposed) of the shortness of the leverage which was left in consequence of the fracture, he forcibly flexed the elbow over the arm of an assistant, and soon reduced the luxation. The patient was able to resume his work in forty days.—*Brit. Med. Journ.*, Nov. 30, 1861, from *L'Union Médicale*, Sept. 7, 1861.

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46. *Dislocation of the Foot Forwards.*—Dr. DEMARQUAY relates (*Moniteur des Sciences Méd. et Pharm.*, Oct. 1, 1861) a case of this rare accident. The patient fell from the last round but one of a ladder which he was descending, in such a way that the left heel was fixed at the edge of a piece of wood, and the leg inclined backwards. To save himself from falling backwards, he caught a piece of wood with his right hand, and supported himself with the right foot. The left astragalus was driven forwards from its articulation with the tibia and

fibula. When M. Demarquay saw him, eight hours after the accident, he found the upper surface of the astragalus forming a projection in front; the foot was rotated on its antero-posterior axis, so that the sole looked inwards, the external border rested on the bed, and the inner edge was directed upwards. The tibia touched the tendo-Achillis, the projection of which had disappeared; the malleoli were displaced backwards; there was no fracture of the fibula; and the tendon of the peroneus brevis projected at the outer side. After having given chloroform so as to produce complete muscular relaxation, M. Demarquay drew the heel backwards, at the same time bending the foot on the leg, which was held fixed. This manœuvre had to be performed several times before reduction could be effected. A moderately tight bandage was applied, and kept moist with cold water. No symptoms of any importance occurred; the tumefaction gradually diminished; and the patient recovered, with perfect use of the limb.

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47. *Fracture of a Rib produced by a Sneeze.*—Dr. D. F. Castella, of Fribourg, relates the following example of this:—

A keeper of a public-house, thirty-nine years of age, has a robust constitution, although he has suffered during his life from various maladies, apparently of a strumous nature. On the 6th November, 1861, he was seated in his bar with several customers, one of whom offered him a pinch of snuff, which he accepted. Not being in the habit of snuffing, he was at once seized with a fit of sneezing, which he attempted to restrain by shutting the mouth and forcibly dilating the chest. In this, however, he failed, and a violent expiration having succeeded to the excessive and prolonged dilatation of the thorax, he felt at the same moment in the left hypochondriac region a sudden, sharp pain, accompanied by a very distinct crack, difficulty of respiration, and a very painful cough. I was at once summoned.

I discovered in the middle of the body of the ninth rib on the left side a very evident crepitation, and an oblique solution of continuity. It was then a fracture of the second false rib on the left side. I was able to confirm this diagnosis, as the same symptom persisted during four or five days, with slight tumefaction of the surrounding soft parts. No complication in the part of the pleura or lung supervened.

I am not aware that violent sneezing has been cited by authors as a cause of fracture of the rib. If this case is not unique, the fact must have been but rarely observed. It is interesting in a surgical point of view, and it is important in legal medicine to know that rapid and strong contraction of the diaphragm, preceded by an excessive and prolonged extension of that muscle, may occasion the fracture of a rib.—*Glasgow Medical Journal*, April, 1862, from *Gazette des Hôpitaux.*

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48. *Transverse Fracture of the Patella.*—Mr. Holthouse showed to the Pathological Society of London a specimen of this, in which the fragments were two inches and a half apart, but united by true ligamentous tissue. He observed that in 1850, Mr. William Adams directed the attention of the Society to a mode of connection of the fragments of a patella fractured transversely that had not, up to that time, been recognized. He demonstrated that certain cases which were usually regarded as examples of true ligamentous union in which the ligament had become elongated, were in reality cases of non-union, the connecting material being no new structure interposed between and uniting together the fractured surfaces, but simply the fascia which passes over the patella in a thickened condition, and having incorporated with it the bursa patella. "In true ligamentous union the separation of the fragments is generally from half an inch to an inch, and Mr. Adams had not seen it exceed one inch and a half." The specimen exhibited was removed from a patient of Mr. Holthouse, who died in the Westminster Hospital; but as the lesion was not observed till after death, no history of it could be obtained. A longitudinal section through the two fragments and their connecting mediums, showed the latter to consist of true ligament, two inches and a half in length, uniting the fractured surface of one fragment to that of the other, and inclosed between the fibrous capsule of

the joint on the outside, and the synovial membrane on the inside. The ligament was strong and thick at its attached extremities, but became somewhat thinner towards its centre. Mr. Holthouse observed that he considered the specimen worthy of exhibition on three grounds: 1st. Because it showed that a separation of the fragments of a broken patella to the above extent is not necessarily a proof of non-ligamentous union. 2d. Because it illustrated the extent to which the new material may become elongated; for he supposed it would not be disputed that at one period the fragments must have been, if not in actual contact, at least in much closer apposition than at present, or no new uniting material would have been thrown out; and 3d. Because it demonstrated the importance of not using the limb till the uniting medium had become sufficiently firm to resist the action of the muscles which flex and extend the leg.—*Med. Times and Gaz.*, March 15, 1862.

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49. *Statistics of Amputations at the Hospitals of Paris.*—Dr. ULYSSES TRELAT communicated to the Academy of Medicine of France (March 25, 1862) the statistical results of the greater amputations in the Parisian hospitals. These statistics embrace the following hospitals: Hôtel-Dieu, from 1850 to 1861 inclusive, 11 years; Pitié, from 1851 to 1861, 10 years; Charité, from 1850 to 1861, 11 years; Saint Antoine, from 1853 to 1861, 9 years; Necker, from 1848 to 1861, 14 years; Beaujon, from 1850 to 1861, 11 years; Lariboisière, from 1854 to 1861, 8 years; l'Hôpital des Cliniques, from 1855 to 1861, 7 years; l'Hôpital des Enfants Malades, from 1851 to 1861, 10 years; Sainte Eugénie, from 1854 to 1861, 8 years—in all, 99 years, almost a century of hospital practice.

Excluding some exceptional cases which are pointed out and disregarded, there were 1144 amputations, as follows: At the hip-joint, 3; thigh, 360; at the knee-joint, 4; leg, 418; foot, 116; shoulder-joint, 27; arm, 141; elbow-joint, 4; forearm, 44; hand, 27.

Of the whole number, death resulted in 522, or in 45.6 per cent.

Pathological amputations, 568; deaths 223, or 41 per cent.

Traumatic amputations, 470; deaths 261, or 55.5 per cent.

Amputations from undetermined causes, 28 deaths, or 26 per cent. The smallness of this mortality results from there being included in this category a proportionably great number of children.

The mortality among males was 438 in 908 operations, or 48.2 per cent.; among females, 84 in 236 amputations, or 35.5 per cent. M. Trelat explains this difference, 1, by the relative fewness of operations and of severe wounds in the female wards.

As to age, that which furnishes the smallest mortality is that from 5 to 15 years, viz., 18.9 per cent., or 15.2 in the pathological amputations, and 16.6 in the traumatic. The mortality previous to the fifth year of life is nearly the same as that between the ages of 15 and 30; after the 15th year it increases regularly and without interruption, whatever may be the nature of the amputation or the sex of the patient. Beyond 70 years of age it becomes so large as 95 per cent., that is, one only recovers of twenty operated on; hence M. T. reprobates amputation in those above 70 years of age.—*Gazette Hebdomadaire de Med. et de Chirurg.*, March 28, 1862.

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50. *Perforating Gunshot Wound through the Thickness of the Lung; Recovery.*—Dr. WOODS, R. N., records the following remarkable case:—

Private E., Royal Marine Infantry, whilst serving in the Burmese campaign, was struck by a musket-bullet two inches below the right nipple. The projectile passed back and out through the thorax, between the fourth and fifth ribs near their angle, posteriorly, whence, being unable to perforate the elastic skin, it passed round horizontally to the median line, and lay upon the spine beneath the integument and facia.

I forthwith turned the man over on his face, and cut down upon the bullet with a fair crucial incision. And here, I may observe, that no sugeon in the field should underrate the importance of extracting even a superficial bullet under such circumstances, especially if it be contiguous to a cavity, unless he has a tenaculum forceps to grasp it with: for if possible the elastic "cyst," as

it were of fascia, enveloping the bullet, will jerk it back into its trajet, unless the incision be very free, and the grasp of the ball tenacious, whilst the patient and his comrades regard with the greatest anxiety the successful extraction of the bullet. And no subsequent time like the moment of being stricken, whilst the faculties are all engaged elsewhere, will the surgeon find equally desirable for operation or extraction. In this instance, I fixed the bullet against the underlying spine, and thus extracted it with facility. Florid arterial blood spurted from the wounds at each inspiration and expiration, and the same, mixed up with air-bubbles, was thrown out by the mouth in frequent short coughs. The pulse was at 130, small and fluttering; the surface was clammy and cold; and the anxiety of countenance such as one only sees in the course of gunshot wounds of vital organs. His mouth being parched, and utterance *nil*, I poured down his throat a draught of rum and water from my canteen; and observing a portion of his shirt deficient, where the bullet had sped, I passed a long steel ball-probe through the wound, into the lung, which was marvellously insensible to the touch, but could thus discover no foreign body.

I next applied a roller so as to fix the ribs as far as possible, leaving the wounds free, and I dressed the apertures but lightly with lint, so that the blood might flow externally, rather than that unnecessary effusion should occur within the pleural cavity.

This, I am aware, is a moot point in military surgery, whether, if hemorrhage must occur from a wounded lung, it were better to be internal, so as to make pressure within the pleura on the lung? or whether the surgeon in the field had better, by all means in his power, induce the arterial hemorrhage to flow externally instead, if flow it must? The former object I, in this case, had some intention of trying to favour, by fixing the ribs on that side with a thin coating of plaster of Paris applied over a piece of lint, moistened with gum-water, and allowed to "set" upon the ribs, as a light "mould," in fact, trusting afterwards to absorption of the effused blood. However, the man's anxious expression caught my eye, and I concluded I had better follow the beaten track whilst his life hung thus upon a thread, rather than innovate, however plausibly, shut off as I was from consultation by several hundred miles of space. Would any member or members of the Surgical Society grant the favour of an opinion on this subject? Much arterial hemorrhage from the shot wounds, and through the mouth, occurred at intervals for twelve hours, during which I kept the man in the sitting or semi-recumbent posture. Acetate of lead and opium were given every second hour in pill, and he used a solution of tartarized antimony every half hour, which with fresh tonics and cold acidulated drinks, constituted his treatment thus far. The hemorrhage then ceased, and I had no recurrence of it.

On the third day his tongue was thickly coated; urine scanty and high-coloured; pulse, which previously had fallen to 100, now 130. Continuing the antimonial, I gave him a calomel and nitre purge, when his pulse again fell to near 100; tongue cleaner.

On examining his chest there was dulness for a palms' breadth around the wound of entry, and the same near the angles of the ribs, where the bullet left the thorax, with external discolouration. The respiratory murmur was absent in the same situation, and there were bloody râles throughout the entire lung. He had a short hacking cough and hurried constrained respiration, with dilated nostril, and a painfully anxious countenance, especially when the bandage was temporarily removed. On the fourth day he was breathing better; countenance was less anxious; pulse was at 90; evacuations were natural: there was slight dry cough, and both wounds were suppurating kindly. Percussion and auscultation gave the same results as before. I now gave him a blue pill morning and evening, and a few fowls were foraged out for broth. In a few days, the gums being slightly touched with the mercurial, and all active treatment stopped, I was enabled to remove him to the hospital ship, several days' journey distant, where I continued in charge of him.

The wounds suppurated freely for a month, and then, for the first time at the posterior orifice, appeared in the discharge a strip of his shirt, which being carried in by the bullet, traversed the lung from front to rear. I had him in my

charge for a fortnight after, at which time the anterior wound (of entry) was completely healed; the posterior one very nearly so. I applied a mixture of iodine and mercurial ointment as a discutient, in the neighbourhood of the hepatized lung, for several days, by which I think the obstruction was in some measure removed, and the constriction and sense of pain through the chest alleviated. The man was now able to walk about; general health tolerably good. There was a slight hitch remaining in the respiration, some pain of right side, and his chest was somewhat hollowed from absorption of tissue in the neighbourhood of the bullet track. There was some slight bulging of the intercostals at the lower part of the pleura, and dulness corresponding to it, but no evidence of fluid from succussion. Pulse was 80; countenance, "shot-stricken."

The man was no doubt ultimately discharged from the service, as unfitted to bear the vicissitudes of a "sea soldier's life," but I dare say able all the while to supplementalize his means of living and his pension by any light employment in civil life. This case is interesting, inasmuch as I see that perforating gunshot wounds, through the thickness of the lung, are in most instances recorded as fatal.—*Dublin Medical Press*, April 9, 1862.

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51. *Difficulties in the Treatment of Umbilical Hernia.*—M. HUGUIER, in a discussion in the Surgical Society of Paris, gave a summary of the causes which, in his opinion, render strangulated umbilical hernia and the operation thereon specially dangerous. Some of these causes are primary—arising out of the anatomy and pathology of the parts; the others are surgical—attending and following the operation. The primary causes are the following: 1. The abdominal opening, in general circular or oval, narrow, resistant, and with thin edges, bruises and almost cuts the parts. 2. The umbelliform or mushroom-shaped arrangement of the protruded parts gives the tumour a narrow pedicle in proportion to the mass which has escaped. 3. The thinness of the coverings predisposes to accidents in three ways—by bruising of the parts; by inflammation of the distended and weakened coverings; and, perhaps (as in an example related by Boyer), by their rupture through a fall or blow. Further, this state of the integuments render the intestines liable to injury during operation. 4. The sac contains little or no serosity. 5. The sac is frequently gangrenous. 6. The large size of the tumour, and the adhesions which it contracts, render it more frequently irreducible. 7. The vicinity of the strangulation to the peritoneal cavity predisposes to visceral and parietal peritonitis; this circumstance is of great importance in a surgical point of view. The surgical or consecutive causes of peril are these: 1. In the first stage of the operation, there is great danger of wounding the herniated parts, in consequence of the thinness of the coverings, the frequent absence of fluid from the sac, and the presence of numerous adhesions of the viscera to each other and to the peritoneum. 2. In the majority of cases, it is necessary to reach the intestines, to pass through the epiploon; which, after being wounded, is returned into the abdomen. 3. The herniated parts may suddenly burst through the incision in the covering. Boyer and M. Huguier have both met with instances of this. 4. After the parts are denuded and liberated from strangulation it is extremely difficult, sometimes even impossible, to reduce the hernia. 5. The proximity of the incision made in releasing the strangulation to the parietal peritoneum necessarily causes this to be wounded. In inguinal and crural hernia, the strangulation is at a distance from the great peritoneal cavity; whereas the reverse is the case in umbilical hernia. 6. Extension of inflammation from the sac to the peritoneum is more rapid and much more unavoidable than in other herniæ. 7. The dependent position of the hernial opening, when released from strangulation and enlarged, favours (as M. Velpeau has observed) the escape of blood, pus, and decomposed fluids into the peritoneum. M. Huguier says that blood is by no means innocuous; he has seen violent peritonitis produced by the presence of a small quantity in the cavity. If an operation is to be performed, he advises that complete herniotomy (incision of the coverings, release of the strangulated parts, and reduction) be practised only in small, recent umbilical herniæ, which have been previously reducible. In most other cases, he prefers opening the intestine to

releasing the strangulation and reducing the parts.—*Brit. Med. Journ.*, Jan. 25, 1862, from *Gaz. des Hôpitaux*, Nov. 23, 1861.

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52. *Æther and Belladonna in Strangulated Hernia.*—Dr. BURKHARDT states that for many years past he has employed for the reduction of strangulated hernia, in conjunction with the taxis, a mixture of one ounce of ether and two drachms of tincture of belladonna, which is either dropped upon the hernial tumour or applied to it as a lotion. He has seldom found it fail even in cases in which the strangulation has long existed. The benefit which results is not a consequence of the mere cold produced, which may easily be induced, and in a much greater degree, by other means, without the same effect being produced.—*Med. Times and Gaz.*, April 19, from *Varges' Zeitschrift*, vol. xv. No. 1.

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53. *Camphorated Chloroform as a Local Anæsthetic in Extirpation of the Toe Nail.*—M. MARTENOT DE CORDOUX relates (*Bulletin de la Société de Médecine de Besançon*) two cases of removal of toe nail, in which pain was entirely prevented by the following procedure:—

The toe was in the first place tightly surrounded at its basis with a ligature, and enveloped for twenty minutes in a thick layer of lint impregnated with camphorated chloroform, and to obviate evaporation, a water-proof cloth was laid over all. The fluid used consisted of a solution of four drachms of camphor in one ounce of chloroform.

M. Martenot de Cordoux removed at one sweep of the knife, by Mr. Bauden's operation, one-half of the nail and the exuberant flesh; and although in one case this procedure had to be twice repeated, the anæsthesia was so complete that no pain whatever was experienced.—*Glasgow Medical Journal*, April, 1862.

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54. *Congenital Inversion of the Bladder; Cure.* By J. LOWE, M.D.—This affection is so rare that it is passed over in silence by most authors of systematic works on surgery. The only recorded case which I have met with is that given by Mr. Crosse, in the *British and Foreign Medical Review* (Oct. 1846, p. 319),[1] which is exceedingly interesting as showing the importance of careful diagnosis before attempting any operative measures on tumours of the genital parts in female children. In this instance, the patient, aged three years, had a tumour, to which a surgeon was about to apply a ligature, when Mr. Crosse, who happened to be present, fortunately discovered an aperture which he found to be the ureter. The operation was of course postponed *sine die*. By firm pressure the inverted bladder was made to repass into its natural position, and consequently the child was saved from an untimely death. The report goes on to say that the prolapse of the bladder did not subsequently return; and the patient grew up to womanhood with no other inconvenience than a constant incontinence of urine.

The following report of a very similar case may prove worthy of being recorded, more especially as operative interference, which does not appear to have been found necessary in Mr. Crosse's case, was here pursued with excellent results:—

M. A. H——, aged two years and a half, a fine, healthy, but very irritable girl, was admitted into the West Norfolk and Lynn Hospital on the 10th of November, 1859. On examination, a vascular-looking tumour, about the size of a large Italian walnut, was found projecting between the external labia. When the little patient cried, the tumour became more injected, and increased considerably in size; at the same time, a gush of urine took place. On closer inspection, the mass was found to be seated at the orifice of the urethra. On making a little gentle pressure, the tumour receded under the finger, and presently disappeared altogether within the urethra, and the forefinger could be readily passed into the bladder. I had, therefore, no difficulty in diagnosing an inversion of the bladder.

From the statement of the mother, it appeared that the child had been subject

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[1] From the Transactions of the Provincial Medical and Surgical Association, vol. xi., 1846.

to incontinence of urine from its birth, and that from the time it was two or three days old, a small substance had been observed to protrude during a fit of crying or straining. Each effort of this kind was followed by a flow of urine, and the child's condition from this cause was truly pitiable. The thighs and labia were much excoriated, and the latter, as well as being swollen and indurated, were covered with numerous pustules. Until the age of two years, the tumour had receded as soon as the fit of straining was over; but latterly it constantly protruded more or less.

After considering the various means which might afford a chance of improving this distressing condition, I resolved upon making use of the actual cautery, which seemed to me best adapted for narrowing the calibre of the urethra, and thus preventing the descent of the bladder. Accordingly, after putting the patient under the influence of chloroform, and having replaced the bladder within the pelvis, where it was retained by two stout probes, which served to keep the canal patent, a female sound, heated to a white heat, was applied to the track of the urethra. A small curved catheter with a bulbous extremity, which had been previously made by my direction, was then introduced and fastened in, and the patient put to bed. No constitutional symptoms followed, but there was considerable pain in passing urine.

On the 17th, a small shred of slough separated. Patient can retain four ounces of urine when in the recumbent posture.

Dec. 1st. The catheter on being removed was found coated with a thick deposit of phosphate of lime; urethral canal perceptibly smaller.

After the expiration of a month, during which time there was destillation pretty constantly, with occasional power of retaining several ounces of urine, the cautery was again applied as before. The same manifest improvement followed. The child became much more comfortable and cleanly in person. The excoriations almost entirely disappeared, and the pustules healed.

On three subsequent occasions (making five in all) the cautery was repeated after long intervals. The urethra became so much diminished as to admit only a No. 4 catheter; urine escaped only when patient cried or strained.

After having been a patient of the hospital about eleven months, during the latter part of which she was an out-patient, coming in at intervals to be operated on, she was discharged. I have since learned that she continues well, with not the slightest evidence of prolapse, but with some degree of incontinence of urine. —*Lancet*, March 8, 1862.

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55. *The Cochin China Ulcer.*—M. ROCHARD, Chirurgien-en Chef of the French Navy, describes a form of ulcer which is endemic in certain parts of Cochin China, and has prevailed extensively among the French troops in that country. Its predisposing causes are the insalubrity of the climate, and the consequent anæmia and debility. It is more severe during the rainy season; age, constitution, and race, have no influence on its production. The characters of the ulcer are aggravated among the natives by dirt, skin-diseases, weak constitution, and the want of treatment. There is no evidence to prove that it is contagious; but rather the contrary.

The ulcer always commences with a lesion of the skin, never suddenly; but, in debilitated subjects, the most insignificant wound or erosion is sufficient to produce it. The lower limbs are always its seat; it especially attacks the ankles, the anterior part of the lower third of the leg, the instep, and the dorsal surface of the foot. M. Rochard has never known it to appear on the plantar surface. It is generally solitary, but sometimes both legs are affected at the same time. The diameter of the ulcer is rarely less than nearly two inches; but sometimes it extends round the legs, and in some very rare cases the whole leg has been involved. The form of the ulcer is irregularly angular. The ravages of the disease are generally confined to the skin and subcutaneous tissue: in severe cases, however, it burrows among the muscles, and produces exfoliation and necrosis or caries of the tendons and bones. In this condition, amputation is the only resource, but is rarely successful.

The progress of the disease is rapid. Under the influence of the predisposing causes already mentioned, an apparently insignificant lesion becomes painful; it

is surrounded with a dark red areola, and in a few days there is a large ulcer of gangrenous aspect, from which escapes an extremely fetid ichor. The inflammatory period is accompanied by pains which contrast strongly with the complete insensibility which prevails at a later period.

After a variable time, the ulcer ceases to increase; it becomes clean; an eschar, comprising generally the entire thickness of the skin, is detached, leaving a sanious surface, which is soon again covered by a pultaceous layer. In the most severe cases, the disease runs its course, increasing in surface as well as in depth; and finally produces death, unless amputation be performed. In the more favourable cases, after numerous alternations of amelioration and of relapses, cicatrization is established; and, if the patient can leave the country and regain his strength, the cure is permanent. In other cases, again, the disease becomes chronic; and it is in this form alone that M. Rochard has had personal opportunities of observing its character. In the patients under his care at the Brest Hospital, the ulcers presented a depressed, uneven base, traversed by deep red longitudinal streaks, consisting of small anastomosing bloodvessels, having between them yellowish lines of a pultaceous aspect. The edges of the ulcer are callous, as if cut perpendicularly, but irregular; the surrounding skin is wrinkled, the folds radiating towards the centre of the ulcer. There is complete anæsthesia, not only in the parts immediately affected, but also in the surrounding parts, and sometimes even in the whole limb below the ulcer. In one case, the ulcer was seated below the external ankle; and both the dorsal and the plantar surfaces of the foot were insensible; no sensation was produced by the application of the strongest caustics or of red hot iron. The subjacent muscles are also sometimes paralyzed; this happened in the case just mentioned. No treatment seems successful. Cauterization, with tonics and good diet, have appeared at first to produce the most promising results: but as a rule, the disease returns as soon as the patient begins to walk. In one case, where the ulcer was seated on the dorsum of the foot, M. Rochard obtained a successful result by excising the ulcer, and performing partial excision of the foot.—*Dublin Med. Press*, May 21, 1862, from *Gaz. des Hôp.*

OPHTHALMOLOGY.

56. *Frequent Evacuation of the Aqueous Humour as a Means of Causing the Absorption of Cataract.*—Prof. Sperino, of Turin, recommends the repeated evacuation of the aqueous humour for the purpose of causing the absorption of opacities of the crystalline lens, and asserts that it has proved successful in various cases under his care at the hospital at Turin. He remarks, "The practical studies I have been continuing for several years on the new method of treatment in various disorders of the ocular bulb, have induced me to have recourse to it also in the case of persons labouring under cataract. The facts observed by me up to this day at the Ophthalmic Hospital, at the House of Public Assistance, and within the range of my own private practice, have proved to me that the evacuation of the aqueous humour effected daily, or even every second or third day, will gradually restore transparency to the crystalline lens, and consequently remove the obstacle which impedes vision. It is curious to observe how the opaque materials of the crystalline lens are gradually replaced by transparent ones, owing to the frequent removal of the aqueous humour, and it is not less consolatory to hear the patients daily congratulate themselves on the gradual recovery of their eyesight. At present I merely announce my discovery, but I shall soon publish my clinical observations, which are daily increasing in number, and I shall then describe the experiments by which I have been guided, the method of cure, its effects in the various kinds of cataract, and different degrees of opacity of the crystalline lens; in a word, all I daily learn from the attentive observation of facts. Let me, however, remark, that, supposing in certain cases the mere evacuation of the aqueous humour were not found suffi-

cient to obtain a perfect cure, this observation would still have the effect of restoring the functions of the inner vascular system of the eye, and would thus at all events prepare the patient by placing him in the most favourable condition for the operation of the cataract."

Dr. J. G. Hildige has experimented with this method, and has given the results in a recent No. (May 21, 1862) of the *Dublin Medical Press.*

"Having," says Dr. H., "some misgivings as to whether a frequently repeated paracentesis of the cornea might not cause a too great irritation of the ocular bulb, I selected an eye that was not only cataractous but also partially amaurotic. The patient, Mrs. C., æt. 45, residing in Redmond's-hill, is affected with soft cataract in both eyes. That in the right eye is perfectly formed; the internal portion of the retina is, however, insensible to light, so that when a candle is held in the external part of the field of vision, at the distance of a few inches from the eye, it is not perceived; the other tissues of the eyeball are tolerably healthy. The vision of the right eye is still good enough to permit her to go about alone, and to see large objects. General health pretty good. I punctured the left eye with a broad-bladed needle at the external junction of the cornea with the sclerotic, and allowed the aqueous humour to escape. On the following day I repeated the puncture, introducing the needle at the inferior part of the cornea, and so varying the seat of the puncture each time, as to cause as little irritation to the eyeball as possible.

"The eye was slightly inflamed on the third day, the pupil contracted, and other symptoms of irritation present, so that I was obliged to allow two or three days to intervene before resuming the treatment. It were needless to describe the effect of each paracentesis on the eyeball; let it suffice to say that I repeated the operation eleven times, allowing one, two, and three days to intervene, according to the amount of irritation present, and the following was the result of the treatment: The cornea had become slightly conical, so that the anterior chamber was much deeper than in the normal condition; the iris was of a much deeper tinge than that of the other eye; pupil contracted, and small dots of pigment, detached in all probability from the posterior part of the iris, were deposited on the anterior capsule of the lens. On dilating the pupil with atropine, one side of it was observed to be adherent, and masses of pigment were attached all round its circumference, protruding as it were from the posterior surface of the iris. The lens was in every respect in precisely the same condition as it was previous to the commencement of the treatment, presenting the same degree of opacity without the slightest symptom of absorption having taken place in any portion of it. The effect of the frequent paracentesis was certainly to produce hypersecretion of the aqueous humour; this, however, instead of causing absorption of the cataract, produced a more or less staphylomatous condition of the cornea, the anterior chamber not being capacious enough to contain the quantity of aqueous humour secreted. This result has not justified me in experimenting on a second case, the eye having been decidedly damaged by the treatment. As Professor Sperino has, however, promised to publish shortly the notes of his cases, we shall then be better able to form an opinion of the question than we are at present."

[Though we are far from hopeful of the success of this mode of treatment of cataract, it must be confessed that the evacuation of the aqueous humour is likely to affect the nutrition of the lens, as would also its replacement by injecting fluids of different densities. The experiments of Drs. Mitchell and Richardson seem to open a wide field for investigation in regard to this subject.]

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57. *Hereditary Amaurosis.*—Mr. Sedgwick related to the Harveian Society of London the case of a gentleman whose brother became blind from amaurosis in both eyes, between the age of 55 and 60 years, had a family of ten children, consisting of seven sons and three daughters. The first son, who is still living, became amaurotic in both eyes when about 56 years old; the fifth son, who died from paralysis, became amaurotic in both eyes at the age of 48 years; the sixth son, still living, became amaurotic in the left eye at the age of 46 years; and the seventh son, now dead, became amaurotic in both eyes when about 42 years old. Of the other three sons, the second, who died from paralysis at the age of

56 years, the third aged 60 years, who is still living and is partly paralyzed, and the fourth aged 56 years, also living, have no occurrence of the disease. Whilst the three daughters, who are all living—the eldest of whom is now 63 years of age, and is the second child in the family, and the youngest about 38 years of age, who is also the youngest child in the family—have been quite free from the disease. Mr. Sedgwick remarked that the above case would serve to illustrate two points of interest in connection with the hereditary development of disease, viz., the sexual limitation of the disease to the males only in the family, all the females being exempt, and the retrogressively earlier development of it in each succeeding member of the family affected; so that, whilst the eldest of the four brothers became amaurotic at about the same age as his paternal uncle, the three younger became so at an earlier age in each case than the preceding, the sequence being 56, 48, 46, and 42.—*Med. Times and Gaz.*, March 22, 1862.

58. *Amaurosis cured by Evacuation of the Aqueous Humour.*—An interesting case of amaurosis was recently observed in the ophthalmological clinique of the University of Munich. A country girl, aged 18, while at her work, suddenly felt that her sight became diminished. All objects appeared to her as in a haze, and on the next day she was scarcely able to distinguish anything. The day after she went to church, but had to be carried home, as she had then lost her sight altogether. Leeches, ice, and purgatives were used, but without success; and six days after the vision had first become impaired the patient came to Munich, and was received into the University Hospital. The pupils were immensely dilated, and did not contract even if very strong light was used. By means of the ophthalmoscope it was then observed that the arteria centralis retinæ was unusually narrow, and its ramifications did not contain any blood. The vein appeared very dark and narrow, but not to the same degree as the artery; on slightly pressing the eyeball no pulsation could be felt. The choroidea was normal, and its vessels were clearly visible. Otherwise there were no traces of oligæmia; on the contrary, the complexion was ruddy, the pulse full, and the sounds of the heart were normal. The patient complained of noises in the ear, and of heat in the head. At the time when she had become blind, she had just had her courses, but they had been more scanty and shorter than usual. The treatment in the hospital consisted of leeches to the temples; foot-baths, and sinapisms to the thighs. On the second day, calomel, in refracta dosi, was added to this medication. On the third day the patient said that if a hand was passed before her face she could see it with the left eye; while the right continued to be completely amaurotic. After nineteen days there was no further improvement; on the contrary, the ophthalmoscope showed that the arteria centralis retinæ had become still narrower than it had been at first, and that the chief branch of the same artery on the right side did not contain any blood. It was, therefore, feared that the retina might become atrophied in consequence of anæmia of its vessels; and paracentesis of the anterior chamber of the right eye was then performed by the surgeon, Mr. Rothmund, with the view of inducing congestion by the vacuum thus caused in the eye. Immediately after the operation the pupil appeared contracted, as is always the case after paracentesis; but on the next day the patient was able, with the eye upon which the operation had been performed, to count the fingers held at a distance of six inches from the eye; and on the fourth day after the operation she could see the fingers at a distance of one foot and a half. The pupil had, by that time, also again become sensitive to light and dark. As the left eye did not improve in the meantime, it was operated upon in the same manner. The vision then likewise improved in this eye, and on the ninth day the patient was again able to read large type. She was discharged cured, as after some time she could read the very smallest type, and the ophthalmoscopic examination showed that both retinæ were perfectly normal. A similar case has been published by Dr. A. Von Graefe, who by excising a piece of the iris of the right, and making the paracentesis of the anterior chamber of the left eye, also completely cured his patient.—*Med. Times and Gaz.*, April 12, 1862.

59. *Retinitis Leukæmica.*—Dr. LIEBREICH, one of the most distinguished pupils of Prof. A. Von Graefe, and of whose researches on retinitis pigmentosa in the offspring of marriages of consanguinity I gave you an account in a former letter, has recently discovered that in patients suffering from leukæmia, a peculiar form of retinitis occurs, which has just as characteristic features as that form of retinitis which is observed in cases of syphilis and Bright's disease. Idiopathic retinitis is, according to Dr. Liebreich, exceedingly rare, and it is a curious fact that, while idiopathic diseases of the choroidea are much more frequent than those due to constitutional distempers, the disorders of the retina are either of local origin, and consequent upon wounds or diseases of the adjacent choroidea, or produced by disturbances of general circulation, as in cases of heart disease and Bright's disease, and by diseases of the blood, such as syphilis and leukæmia.

In retinitis consequent upon Bright's disease, the ophthalmoscopic examination shows that the optic nerve is encircled by an opaque, whitish zone; between the nerve and the zone a grayish-looking part of the retina is visible, which is scarcely to be distinguished from the papilla, which latter has also a grayish appearance. Outside of the opaque zone just mentioned, small and fine points may be generally noticed, which are due to extravasation, and are chiefly frequent in the neighbourhood of the macula lutea. In retinitis syphilitica, on the contrary, the opacity extends from the papilla along the course of the large bloodvessels, and towards the periphery, where it gradually ceases. Extravasations, which are very frequent in retinitis coupled with Bright's disease, are exceedingly rare in syphilitic retinitis; and if present, they are totally different from those observed in the former affection. In leukæmic retinitis it is especially the colour of the bloodvessels and of the extravasated blood, which presents striking peculiarities. The blood and the veins, which are very much dilated, are of a pale pink; the arteries are contracted, and of a bright orange colour, and the vessels of the choroidea of a pale yellow.—*Med. Times and Gaz.*, April 12, 1862.

60. *Embolism of the Arteria Centralis Retinæ.*—The chief symptoms of this disease, of which Dr. LIEBREICH has hitherto observed six cases, are the following: The patient suddenly perceives dimness of vision in one eye, as if a thick cloud was passing. He then generally closes the other eye, and finds that, after a few minutes, the whole field becomes so obscured that not even the faintest perception of light is possible. This condition either remains stationary, or a slight perception of light gradually returns in a limited part of the field. The ophthalmoscopic examination of the eye shows that the circulation in all or several of the arteries of the retina has altogether ceased; the vessels are thin, and partly filled with thick and dark coagula. The central artery of the retina is quite empty, and the veins are also much thinner. A few days after the commencement of the illness, an opacity of part of the papilla, macula lutea, and its neighbourhood, is visible; and between the macula and the optic nerve, small red points are to be perceived, which are owing to extravasated blood. Although there is no blood in the arteries, the venous circulation is not entirely stopped, but it is retarded and irregular. After some time, however, this is, in a measure, re-established; while the arteries either remain empty, or again contain a little blood. The opacities in the macula lutea undergo various changes as to colour, size, etc.; and, finally, the optic nerve is completely atrophied.

In five out of six cases of this affection there was heart disease. In one case considerable insufficiency of the aortic valves, with consecutive hypertrophy and dilatation of the left ventricle, was found to exist. The compensation afforded for the valvular disease by the hypertrophied muscular substance of the heart was so complete that the patient was not even aware of having heart disease, and which was only discovered by Dr. Liebreich after, by the embolism of the arteria centralis retinæ, he was led to make the physical examination of the chest. In the same patient, an embolus was some time afterwards lodged in the brain, and produced hemiplegia.—*Ibid.*

61. *Loss of an Eye from the Bite of a Leech.*—Prof. Von Graefe relates, in the second part of the seventh volume of the *Archiv für Ophthalmologie*, the case of a delicate little girl, of five years of age, who, some days before he saw her, had on account of headache been ordered a leech to the right temple. The eye itself before this application had been quite healthy, and its vision perfect. He found the interior chamber filled with blood; the lower half of the conjunctival sac, including the edge of the cornea, ecchymosed; in the lower half of the cornea, nearly a line from the limbus conjunctivæ, a wound, the edges of which and neighbourhood were somewhat swollen, and presented a grayish opacity. The form of the wound, on close inspection, left no doubt that it was the result of the bite of a leech. It came out, that, in making the application ordered, the leech had slipped away, had crept into the eye, and there, under considerable pain to the child, had accomplished its work of destruction. Unfortunately, perception of light was completely lost, apparently in consequence of total separation of the retina by hemorrhagy.

As the Professor had never in such a case of hæmophthalmos, from whatever cause arising, observed a restoration of sight when once quantitative perception of light had for more than some hours been lost, so here he gave the most unfavourable prognosis. He saw the child a few times afterwards. The blood in the anterior chamber had partly disappeared, the eyeball was already boggy, and he had no doubt that phthisis oculi had commenced.

The Professor observes, that the case, while on the one hand it serves as a warning against the careless application of leeches in the vicinity of the eye, is interesting in another respect, that the bite was not within the extent of the conjunctiva, but nearly a line from it, and in a part which in the normal state is deemed destitute of vessels. How far the leech filled itself with blood, and how long it sucked, he could not determine. The conjunctival ecchymosis terminated abruptly at the limbus conjunctivæ, from whence, in the direction of the wound, there was only a non-vascular infiltration. It is also possible, he observes, that no blood escaped by the wound, but that the strong suction alone used the intra-ocular and extra-ocular hemorrhagy.—*Glasgow Medical Journal*, April, 1862.

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62. *Piece of Stone Imbedded for Seven Months in the Cornea.*—Dr. Wm. Hutchinson records (*Dublin Medical Press*, March 26, 1862) the following example of this:—

On the 26th of July, 1861, a man, æt. 56, presented himself "suffering under intense pain, and covering his left eye with his hand, on removing which I at first sight thought I saw the iris protruding through the cornea, but changed my opinion at once seeing it was exactly in the centre of the cornea. I asked him his history of his case, and he told me he had been breaking stones for the road in the week before Christmas, 1860, just seven months, and he thought a piece of the stone (which I inclose herewith) struck him in the eye, and he had intense pain, &c. Strange to say he was treated for the seven months as a case of procidentia iridis, and was suffering the same pain all that time. I got a cataract forceps, and brought out the little piece of stone without using any force. The aqueous humour followed in a jet. The poor man was greatly delighted at the cessation of the pain. The cornea in this case had wonderful endurance, for it remained in a perfectly sound state, notwithstanding the long continuance of the hard body imbedded in its substance exactly opposite the pupil for seven months. He was discharged on the 5th of September, seeing nearly as well as ever.

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63. *Rectification of Divergent Strabismus by the Methodical Use of Prismatic Glasses.*—An eye affected with squinting, as our readers are aware, seldom takes any share in binocular vision; when it contributes to the function, it is but in a very limited degree, and only provided the divergency is moderate. In general the deviating eye has separate sensations, and the healthy eye alone is used by the patient.

If, under these circumstances, the image of objects seen by the healthy eye be placed before the inert organ with the assistance of a prismatic glass of an

angle proportionate to the degree of the squint, both eyes will be in possession of two similar images, at the intersection of the ocular axes, and coalescence of the two figures, and subsequent visual perception of a single object will be the result.

Both eyes are thus artificially brought into simultaneous action; but for restoration of the regularity of the ocular axis nothing yet has been done. Now, if instead of the prism above described, the angle of which (at the summit) would be about double the angle of deviation of the eye, a prism is used of a slightly smaller angle, inferior, for instance, by two or three degrees to that of the deviation, each organ still receives the impression of the object, but not precisely at the same focus. The images are seen double, but in close approximation, crossed if the strabismus is divergent, superposed if internal.

In accordance with Wheatstone's law on binocular perspective, the tendency of the patient is to exert himself continually to neutralize the diplopia, and as, on account of the angle of the prism, the images are very close to each other, the instinctive effort overcomes their separation; they soon blend, and as this result is due to the agency of the muscles of the divergent eye, a part, however small, of the deviation is thus corrected.

When the diseased eye has, by uninterrupted exercise of a certain duration, say about a week, gained a little in the right direction, another prism of a smaller angle is used, and the eye is for another week compelled to fresh exertion, and after a short time binocular association is gradually restored.

On these principles, Dr. GIRAUD-TEULON, formerly a pupil of the Polytechnic School, and the author of a recent treatise on the physiology and functional pathology of binocular vision, rests his treatment of squinting in a case recorded in the *Gazette Médicale*.

On the 24th of April of the present year, a young lady, aged 17, was presented by Mr. Demarquay to M. Giraud-Teulon, as an instance of strabismus resulting more probably from functional than from anatominal disease. The right eye, in which existed some slight corneal opacity, was considerably divergent; the outer edge of the cornea being in contact with the external canthus in more than 20 degrees' deviation. *No muscular retraction* was present, but some slight spasmodic movements were observed, and the eyeball moved freely from one side of the orbit to the other. In the healthy eye the visual function was perfect, but the other was decidedly myopic. Thus, in order to read with this eye alone, the patient was obliged to use a biconcave glass, No. 14;[1] and to read without effort, with both eyes together, the divergent eye required the assistance of a prism (with its summit turned outwards) of 18 or 20 degrees.

From these data, M. Giraud-Teulon concluded that the great disparity in vision between the two organs was the cause of squinting, and ordered the patient to wear glasses constructed as follows: Before the left eye a plane glass, No. 0, and before the right a biconcave glass, No. 14, in contact by its external surface with a prism measuring at its summit (turned outward) 14 degrees.

The treatment was instituted May 4th.

Every eight or ten days the angle of the prism was reduced by about two degrees, and the axis of the eye restored in a corresponding amount to its natural direction. A singular circumstance was then observed: in proportion as the divergency decreased, and as binocular vision was accomplished with weaker glasses, the patient complained that the sight of the sound eye was becoming shorter. M. Giraud-Teulon then measured the range of vision in this eye, used singly, and found it what it was at the beginning of the treatment; he again measured it, both eyes acting together, and to his surprise discovered that the originally healthy eye had become myopic in binocular association. He then resumed the treatment, substituting for the plane glass of the left eye a biconcave glass, No. 14, as on the other side, and after two months' perseverance binocular vision was restored, natural *as to direction*, but *myopic* on both sides. Towards the 15th of July the patient was even compelled to exchange her glasses for biconcave spectacles, No. 12, and all further artificial rectification by means of prisms was abandoned. All that could be expected in this case

[1] French scale.

was thus attained, and the patient must persevere in the use of the common lenses used by myopic persons, with the assistance of which she is enabled to perform all the duties of life.—*Glasgow Medical Journal*, April, 1862, from *Journal of Practical Medicine.*

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64. *Hemorrhage into the Anterior Chamber of the Eye, supplementary to the Menstrual Flux.*—M. Guépin relates the curious case of a young lady, aged 18, of good constitution, with a delicate skin, and somewhat lax tissues who commenced menstruating three years since. The menses returned every thirty or thirty-two days with tolerable regularity, lasting sometimes but one day, and at others five or six, and generally three days, the quantity of fluid lost thus varying greatly. She has always found that on the cessation of the menstrual flux there has been a supplemental epistaxis, this being more or less abundant in inverse proportion to the quantity of menstrual fluid lost. On one occasion, however, the epistaxis did not appear, and then a sudden effusion of blood into the anterior chamber took place, which brought her under the author's notice, the menstrual discharge on this occasion only having lasted two hours. The lower part of the anterior chamber was filled with blood, which rode over the free edge of the iris. The author believes the case to be unique, the one nearest approaching to it being an example of hemorrhage into the vitreous humour in a subject of amenorrhœa reported in the thirty-fifth volume of the *Annales.*—*Med. Times and Gaz.*, March 29, 1862, from *Annales d'Oculistique*, Vol. XLVI.

MIDWIFERY.

65. *Mechanism of Labour.*—Dr. Halahan read before the Dublin Obstetrical Society the following paper on this subject:—

"The position in which the head of the fœtus enters and passes through the pelvic cavity during labour, has long occupied the attention of many midwifery practitioners, and given rise to a great deal of discussion. But I am convinced every practical man must allow that the description given by Naegelè, is the accurate, and also the only correct one; and that the practitioner cannot, with any degree of truth, contradict the statement that the head, at the full term of gestation, enters the pelvis in the four positions described by him. I shall here briefly enumerate them, the first has the anterior fontanelle directed to the right sacro-iliac synchondrosis, and the posterior one towards the left foramen ovale; the second, is where the anterior fontanelle is, to the left sacro-iliac synchondrosis, the posterior one to the right acetabulum; the third is the reverse of the first, and the fourth of the second.

"I am equally certain that those who pursue the study further, will agree with me in saying, that although the head enters the brim in the before-named four positions, yet, at the commencement of labour, when the os uteri is barely beginning its dilatation, the anterior fontanalle is always directed towards either acetabulum or presenting in the third or fourth positions of Naegelè. That the fourth changes, at the beginning of labour, into the first; and the third does not change into the second until the head is distending the perineum; that this is the general course, any other being an exception.

"That to diagnose the position in the first stage of labour, is one of the difficulties that the accoucheur has to overcome, I am fully aware of. Nothing but constant attention, very extensive practice, together with a delicate touch, will, with any degree of certainty, conquer the obstacles, and make him master of this part of his profession; for, although in theory it seems very easy indeed to be able to diagnose positions, or to say which fontanelle presents at either acetabulum, we find, in practice, it is one of the most difficult points to be perfectly satisfied about, particularly when the head is high up, the membranes entire, and the os uteri not more dilated than to the circumference of a shilling.

"If, then, it is a fact that at the commencement of labour the face is always

directed towards the pubes (and I have taken the greatest care and trouble to be perfectly certain, and have fully satisfied myself that it is so, not by the mere examination of a few ordinary cases, but by the most careful and constant investigation of some thousands of patients which I had the opportunity of watching from the commencement of labour until the completion of the second stage), there arises the question, how is it we so seldom find the head in the fourth position when entering the brim, or even in that position when the os uteri is half dilated, but on the contrary, generally discover it in the first? Whereas, in the third, it is the exception for the change to the second to take place until at the termination of the second stage. The simple answer is, that when the posterior fontanelle is on a lower level than the anterior, the change takes place immediately after the accession of labour, or, in other words, when the chin becomes depressed on the chest, or flexion of the head occurs early, which is the case in the presentation of the head in the fourth position. But in the third, we generally find the anterior one a little lower, or on a level with the posterior, the head being neither flexed nor extended, which prevents the change taking place until the posterior one becomes the lower. This seemingly slight difference in the two makes a very great one in the effect of the uterine action in its efforts to expel the head, and make the change which I shall now try briefly to explain.

"I presume all will allow that the pain or force of the uterus takes its course in the axis of the pelvis, and that the entire power may be directed effectually, and with as little loss as possible, it is necessary that the occiput should move in the same axis. This is the case in the first and second positions of Naegelè; consequently, if the head enters the brim in either of these positions, we should expect that labour will proceed favourably. If we examine a patient at the commencement of labour and find the head presenting in the fourth position, the posterior fontanelle will generally be the lower or most easily reached by the finger, the anterior one being very high up, and felt with difficulty. This admits of the uterine force having full power on the head, and the change taking place at once. But when the anterior fontanelle is on a level with, or a little lower than the posterior one, the greater part of the uterine force is lost, being divided between the occiput and sinciput. This can only be understood by remembering the direction the uterine force takes, as well as the part of the head it has most power on, as we will there see that when the forehead is the lower part, the pain has not its full effect on the head, but that there is a loss of power. This is the case in the third position, which I think clearly shows the reason that the head enters the pelvis in the second position so rarely. Again, if we find the anterior fontanelle presenting, in fact, midway between the sacrum and pubes, in the third or fourth position, we may naturally expect that the labour will be rather protracted, and the second stage very much prolonged, for the head will, with very few exceptions, be expelled, face to pubes.

"It may very reasonably be asked, is there any practical use in being able to diagnose in what position the child's head is presenting? Certainly there is, the greatest. I shall merely mention two instances. In applying the forceps, we always intend and wish to place the pubic blade over the ear, which will be felt a little to the right or left of the pubes. Supposing, then, you have the instrument correctly placed, is it not of very great importance to know which ear is towards the pubes, as in the first and third positions, we have the ear in the right half of the pelvis; but if, not knowing the head is in the third, we try to rotate as if it were in the first, we bring it out, face to pubes, which is not so favourable as if we had changed it into the second position, the occiput not adapting itself to the hollow of the sacrum in the same manner in which the face does? Again, if version is to be performed in a head presentation, is it not of the utmost importance to ascertain whether the feet are lying towards the abdomen or back of the mother, whereby we may know which hand to use in performing the operation, and this fact can only be ascertained by an accurate knowledge of the position?

"I have put in a tabular form five hundred cases, in which the head has entered the pelvis, showing the relative frequency of the four positions of Naegelè, taken indiscriminately from the beginning of this year. It will be seen that the first position is the most frequent of all, being 61 per cent.; the third next, being

31.60 per cent.; the fourth next, being 6.40 per cent., and the second least of all, being 1 per cent. That the third changed to the second in every four cases out of five, or nearly so, the proportion being 79.75 that changed, and 20.25 expelled face to pubes. The fourth changed into the first in 84.37 per cent., and continued as it entered the pelvis in 15.62 per cent.

The Ascertained Positions in 500 *Cases*. 1861.

POSITIONS OF NAEGELE.								
	1st	2d	3d	Primary 3d changed to 2d.	Total, 3d Position	4th	Primary 4th changed to 1st	Total, 4th Position
Total in 500 cases .	305	5	32	126	158	5	27	32
Percentage . . .	61	1	6.40	25.20	31.60	1	5.40	6.40

"Of the 158 cases in the third position at the commencement of labour, 126, or 79.75 per cent. changed to the second; and of the 32 cases in the fourth, 27, or 84.37 per cent. changed to the first in the progress of the labour."—*Dublin Quarterly Journ. Med. Sc.*, May, 1862.

66. *Induction of Premature Labour in Cases of Constitutional Affections.*—Dr. Keiller, at the meeting of the Edinburgh Obstetrical Society (February 21, 1861), remarked that cases occasionally occurred where pregnancy was associated with various constitutional diseases in such a way as to render it incumbent on the practitioner to induce premature labour, with the view either of saving the patient's life or of mitigating her sufferings. He wished to bring before the society the history of some cases of this kind, which had recently come under his own observation, and in which he had had some difficulty in deciding as to the propriety of the operation.

1. *Double Bronchitis.*—He had lately had a case of acute double bronchitis under his care in the hospital, where the difficulty of breathing was so great that the patient sometimes appeared in danger of death from suffocation; so that, on more than one occasion, the officers had been summoned from the surgical department under the idea that it might be necessary to have recourse to tracheotomy. As the dyspnœa was greatly increased in consequence of the tumid condition of the abdomen, premature labour was induced, greatly to the advantage of the patient, who felt speedy relief, and who soon afterwards recovered completely. The child, however, had not been quite viable.

2. *Phthisis.*—The history of the next patient, whom he had had under his care in the Infirmary, he would give as it had been drawn up by his clinical assistant:—

"M. D., æt. 36, was admitted into Ward XIII, on the 24th September, 1860. She was married, and had had eight children. On admission, she was suffering from phthisis; and on examination the left lung was found to be very much diseased. At this time she said she had not menstruated for four months. The uterine bruit could be detected, but not the fœtal heart—a few weeks after admission, however, it could be distinctly heard. During the next three months the disease of lungs advanced rapidly; the enlarging uterus, gradually encroaching on the chest, caused severe attacks of dyspnœa, and she often started from her sleep with a sensation of suffocation, which was generally relieved when she assumed the sitting posture.

"*8th January.*—She says she is now at the eighth month of utero-gestation. Dr. Keiller thought there was a chance of saving the life of the child by inducing premature labour, and thereby at the same time freeing her from the frequent attacks of dyspnœa.

"Labour in this case was very easily induced. At 9 P. M. an examination

was made, and as the os and cervix uteri were soft and dilatable, one finger was passed through the os with comparative ease, and the membranes separated to a small extent around it. At 11.30 P.M. she had had a few pains. Examined again and found the os dilated so much that two fingers could now be passed into it, and the membranes separated still further.

"At 6 o'clock next morning the os was fully dilated, and a large bag of membranes protruding. As the right shoulder was the presenting part, turning was practised and the child brought away alive. The placenta was expelled soon after the child, and the uterus contracted pretty well. Little hemorrhage occurred after the expulsion of the placenta. The child was born alive, but was small and weakly.

"The patient's breathing was very much relieved during the next fortnight; but, about three and a half weeks after delivery, she died completely exhausted by the disease of the lung."

3. *Cardiac Disease.*—He had at present under his care another patient, who was pregnant for the first time, and was of a very delicate constitution. She suffered from enlargement of the heart; and although there was no distinct physical signs of any affection of the lungs, yet her case was a very anxious one, as was a member of a very phthisical family, and had herself had some hæmoptysis a short time before. He (Dr. Keiller) did not think it would be necessary in this case to induce premature labour, but thought it extremely probable that it might be found necessary to apply instruments early to hasten labour when it supervened.

4. *Cerebral Disease.*—Another patient, about seven months pregnant, whose case he thought worthy of mention, had been for some time in the Infirmary under the care of his colleague, Dr. W. T. Gairdner, who regarded the case as one of general paralysis. She had become very much reduced in strength, and had been sent into his (Dr. Keiller's) ward with the view of having premature labour induced. She is the mother of seven children; suffered during her last two confinements from puerperal mania of short duration, and about six months ago was observed to suffer from loss of memory and general debility. The patient was unable to give much account of herself; and the facts just stated had been obtained from her husband, who had reminded Dr. Keiller that he had seen the patient, about eight years ago, on the occasion of one of her confinements, when she was greatly exhausted by a flooding, from which, however, she had slowly recovered. He (Dr. Keiller) believed the patient to be the subject of chronic cerebral disease, and although she had been several weeks under his care, he had not deemed it necessary to have recourse to the induction of premature labour, because there seemed every probability that she would be able to carry the child to the full time, and because, as yet, the child was hardly viable. There was this peculiarity in connection with the case, that the abdominal and uterine walls were so thin and lax that the fœtus could easily be moved about in the interior of the uterus by external palpation. The following were the notes of the case as recorded by his assistant:—

"S. C., æt. 38, married. Admitted into Dr. Gairdner's ward, December 13, 1860, suffering from amentia and debility. She is the mother of seven children. During her last two confinements she suffered from symptoms of puerperal mania, but in a few weeks after each confinement she recovered completely. About six months ago she was observed to suffer from loss of memory and debility, and she gradually fell into the state she was in on admission to Ward XV.

"After a residence in Ward XV. of two months, she was rapidly losing strength, and she was sent to Ward XIII., under Dr. Keiller's charge, in order that premature labour should be induced to save the child.

"As Dr. Keiller, however, did not think the time of utero-gestation far enough advanced, and as she improved in general health, the induction of premature labour was deferred."

5. *Fatal Vomiting.*—Finally, he wished to mention, in connection with these cases, the case of a woman who had had several children previously, and had never suffered from any abnormal sickness or other morbid symptoms during her pregnancies, but who had died, about the third or fourth month of her next

pregnancy, of excessive vomiting. In this case he (Dr. Keiller) regretted that abortion had not been induced, as, on post-mortem examination, there was no evidence of any other cause for the vomiting except the pregnancy; and if the uterus had been made to discharge its contents, the secondary and fatal symptom might probably have been relieved.—*Edinb. Med. Journ.*, March, 1862.

67. *Internal Surface of the Uterus after Delivery.*—Dr. J. MATTHEWS DUNCAN read a paper on this subject before the Obstetrical Society of London (May 7, 1862), in which he proposed to show that as the modern ascertainment of the true condition of the decidua or mucous membrane of the uterus in early pregnancy was a great acquisition for physiological science and for practical medicine, the completion of our knowledge of the condition of the same part in the end of pregnancy and after delivery would be equally if not more valuable. Our understanding it thoroughly would contribute greatly to our comprehension of various post-partum diseases, and especially of the heterogeneous aggregation included under the name of puerperal fever. In regard to both of these subjects, the writings of William Hunter had been grossly misinterpreted. Errors which his brother John had introduced had been attributed to him, while a careful scrutiny of his writings showed that he held and taught, though in an imperfect manner, the modern and undoubtedly correct views regarding the decidua of early pregnancy, and the state of the mucous membrane after delivery. Cruveilhier was the anatomist on whose authority most modern authors rested, asserting that after delivery the whole internal surface of the body of the uterus was left, like an amputation-stump, a bare muscular surface, and that healing was effected after a process of suppuration and granulation. This theory was quite inconsistent with physiological and pathological laws, and with the known facts regarding the uterus and the lochia. Heschl accepted the statement of Cruveilhier regarding the denudation of the muscular fibres of the uterus, and only suggested a new theory explanatory of the mode of healing of the surface. Dr. Matthews Duncan maintained that at no time was the muscular tissue laid bare; that a layer of mucous tissue was left everywhere covering the proper muscular structure; that, as the uterus diminished in size, this mucous tissue increased in thickness; and that healing took place by a process analogous to that followed by the skin or any mucous membrane denuded of its superficial portions. He had particularly to point out that this was true of the placental site, in which the persistently open uterine sinuses, after a rich mucous membrane was evident, showed that no new membrane was formed over the old placental surface, as Cruveilhier and Heschl imagined, but that the remains of the decidua serotina reconstructed a new mucous membrane. The author alluded to the valuable contributions to our knowledge of this subject from Priestley and Robin, and commented on the ignorance or neglect by the latter of all but French observations on this subject. He did not agree with the opinion of Robin, adopted by Priestley: that the old uterine mucous membrane is detached about the middle of pregnancy, and a new one then begins to be formed. This notion was quite inapplicable to the placental site; it was quite in opposition to the fact that at no time was the internal surface of the uterus found denuded of mucous structures; and no sufficient observations were adduced on which it could be founded. The new views regarding the internal surface of the uterus after delivery were in accordance with all the other known facts on this subject, especially the absence of inflammation and the nature of the discharges after healthy delivery.—*Med. Times and Gazette*, May 17, 1862.

68. *Unsuspected Pregnancy and Labour.*—Dr. H. TANNER related to the Obstetrical Society of London (May 7, 1862) the following case of this. He was sent for April 17, at nine o'clock in the morning, to see Mrs. J., aged forty-two years, who had been suffering pain in the abdomen since eleven o'clock on the preceding night. The patient stated that she had been married rather more than three years, and that she had never been pregnant. The catamenia were last on some time in June, 1861, but as they had been very scanty for five or six months before, their cessation was attributed to the "change of life." The abdominal pain came on in paroxysms; it had been unrelieved by medicine and

a mustard poultice; and the assistant of a surgeon in the neighbourhood had pronounced the suffering to be due to flatulence and inflammation. This opinion coincided with that entertained by the patient, as well as with the views of the husband, mother-in-law, and a married sister, who had been sitting up with her. On examination it was found that the lady was in labour, the membranes being ruptured, the os uteri dilated to the size of a crown-piece, and the head of the fœtus entering the brim of the pelvis, with the vertex presenting. In a few hours Dr. Tanner effected delivery with the forceps, the child (a female, arrived at maturity) being born with animation suspended; it was, however, restored by the persevering use of artificial respiration, to the gratification of the astonished parents. This case serves to establish as a fact—that a woman may conceive, may go to the full term of gestation, and may be in labour for ten hours, without having any suspicion that she is pregnant.—*Ibid.*

69. *Twins; One Dead at Six Months; Both Retained until full Term.*—Dr. FLECKEN relates a case in which a powerful woman was delivered of a strong, living, and full-timed child. After the expulsion of a very large placenta, another compact, fleshy placenta, in partial connection with the former, followed; the accompanying membranes contained a sixth-month fœtus, the body of which had been compressed so flat that the broadest part of the cranial and thoracic regions did not exceed five lines. The bones of the cranium lay separated from each other, the nasal bones projected as sharp points, and the broken malar bone penetrated the skin. While in the sixth month of her pregnancy the woman had fallen down stairs.—*Med. Times and Gaz.*, March 29, 1862, from *Berlin Med. Zeit.*, No. 2.

70. *Diagnosis of the Sex of the Fœtus.* By Dr. STEINBACH, of Jena.—The question I am about to consider is comparatively so new, the observations regarding it are so isolated, and are so much in opposition to the statements of Dr. Frankenhäuser, that it cannot by any means be regarded as settled. Only a long series of observations, carefully instituted and free from prejudice, can determine whether or not there is any truth in Dr. Frankenhäuser's discovery that a low average of the cardiac pulsations in a fœtus indicates a boy, while a high mean is symptomatic of a girl. In the following pages I offer a small contribution to this inquiry. It is evident that observations of this kind can only be undertaken where material is abundant, and where there is plenty of time at the disposal of the observer; while acting as assistant physician to the Lying-in Hospital of Jena I had the favourable opportunity in question. It was not without some misgivings that I begun and carried on my observations upon 56 pregnant women, in the course of the summer of 1859, but at the end of that series I was able to discontinue my observations, as they almost exactly confirmed the doctrines of Dr. Frankenhäuser, for out of the 56 cases in question I was wrong in predicting the sex only 13 times, and my errors were in cases into which, on account of their peculiarity, it will be necessary to inquire further on, in order to estimate their value in determining the sex of the child. (Here follows a table which contains the results of the examination of the fœtal heart with regard to frequency, made morning and afternoon, from the time of the woman's entering the hospital until the commencement of labour.)

I must now premise a few observations, partly with regard to the examination in general, partly regarding the precautions to be observed, and which ought to be attended to if any result of value is to be obtained.

I did not content myself with examining the pregnant woman two or three times. It is soon found where cases are for some time under observation that considerable variations in the frequency of the fœtal heart occur, and hence a somewhat extended series of examinations is necessary to determine the mean number of its beats. Accordingly I auscultated each pregnant woman every day, morning and afternoon, commencing on the day after her admission into the institution, and continuing my observations until labour set in. It often happens that the observations only commenced in the last days of pregnancy; but, on the other hand, there are a good many cases which were observed during a month and even more before labour occurred, and these confirm the observa-

tions of others that with the advance of pregnancy a diminution in the frequency of the pulse of the fœtus, corresponding with its increasing development, does not take place. I would willingly have instituted observations on the fœtal pulse at a much earlier period of pregnancy; but this, by the rules of the institution, was impossible, as with few exceptions no patients are admitted gratuitously before the last month of pregnancy.

I counted the beats of the heart during a quarter of a minute, and if I found considerable variations from the number I had formerly noted, I counted again several times, and finally took the mean of the observations with regard to variations of the pulse, which, according to some observers, often show considerable differences; it is not to be denied that they do occasionally occur, yet in continuous observations they either equalize themselves, or they are entirely lost in the general sum of the observations. I may mention the two cases in which the differences were the greatest, but in which the exceptional numbers were quite isolated. In the first (a boy), where the variations of the frequency of the heart were on the whole inconsiderable, I found the fœtal pulse one morning fallen so low as 108 without any assignable cause; in the second (a girl), it maintained for some time a frequency of 192.

In reference to the two extreme numbers fixed on by Dr. Frankenhäuser, by means of the variations below or above which we are to determine the sex of the child, I am not entirely at one with him. Though from my observations I have found 131 to be the mean number for boys, and 144 for girls, my extreme number oscillated between 133 and 143, certainly not an unimportant interval in opposition to the assumption of Frankenhäuser, according to whom 136 is the extreme number. I do not, however, consider it necessary to rely on a particular number, because, as I have already stated, slight variations which may range from 1 to 10 may be present, and because slight errors in counting during a quarter of a minute cannot be entirely avoided. But is it not enough if it is only proved that the higher numbers correspond to girls, the lower to boys? In reply to this I must state that mean numbers under 136, which belong to the male sex, are far from not showing such variations as up to 140, and even higher, and I confess that I should have much more confidence in diagnosing a boy if I repeatedly found the frequency of the pulse between 124 and 132.

On account of the difficulty of observations of this kind, I think it not unadvisable to recur to the mode in which the examination is to be performed, and to mention the sources of disturbance and the precautions to be avoided, in order that the fœtal heart may be accurately counted.

The reason of incorrect or not altogether exact observations depends sometimes on the observer, sometimes on the person under examination, sometimes on the fœtus, and not unfrequently upon all three.

An inconvenient position on the part of the observer, which may lead to sleeping of the foot and consequent shaking, or to congestion of the head with accompanying hallucinations of hearing, is always a source of disturbance. The most suitable position is that in which the observer is not at all in his own way; therefore the woman should lie on her back with the head moderately raised, in as comfortable a position as possible, towards the edge of the bed on which the observer is half seated, and from which he bends forward.

Of still greater importance are the sources of disturbance on the part of the pregnant woman; among these I might reckon—1st. Her uneasy position, on account either of her nervous dread of the unusual examination, or of dyspnœa, aggravated by the recumbent posture, or the susceptibility of the parts about the uterus, in consequence of which, on the application of the ear or the stethoscope, the walls of the abdomen are put in motion by the contraction of the muscles by which a disturbing noise is produced. 2d. Sounds generated in the intestinal canal; the communicated breathing of the mother; the sound of the beating of her abdominal aorta. 3d. The contemporaneous occurrence of uterine bruit, which may drown all other sounds.

Still more complicated are the difficulties which may be occasioned on the part of the fœtus. The principal of these are—1st. Its reflex movements, which very often, if not always, are called forth by the straight position of the mother,

as also by the application of the stethoscope or the ear to her belly, and we must often wait for a minute (during which time I remove neither the stethoscope nor the ear from the belly) until the violent movements of the fœtus, and with them the accelerated and unrhythmical action of the heart have subsided. 2d. The occurrence of considerable differences in the frequency of the pulse, which may occur without any assignable external cause, and which may depend upon some unknown conditions of the fœtus, or perhaps upon some peculiar state of the maternal organism. 3d. The sudden occurrence of a murmur in the umbilical cord, which not only may make it difficult to count the pulsations of the fœtal heart, but what is of more consequence, may produce a difference in the frequency of the pulse, a circumstance which was also noticed by Frankenhäuser. It is best to wait until the murmur has disappeared, for where it remains audible and uninterrupted from day to day, it becomes necessary to abandon the observation of the case. 4th. The difference or rather the change of the double beat, consisting in this, that at one time the first sound of the heart, at another the second becomes more marked, which resembles unrhythmical action of the heart, and often makes it necessary to begin to count afresh.

I shall now return to the 13 cases, an analysis of which I promised at the beginning of these remarks.

The first case should be excluded from this series of observations. From the mean frequency of the pulse (141), I inferred the presence of a girl; but these turned out to be twins, which, on account of the great distension of the uterus, it would have been impossible to diagnose. It is right to add that the twins were both boys.

The 2d and 3d cases should likewise be excluded, as, indeed, not the mean number, but the series of single numbers would perfectly have corresponded to a child of either sex. But in these, especially in the 3d case, the mean number cannot be employed, because variations occurred which could not in any way be accounted for.

Cases 4 and 5, and 6, 7, 8, 9, constitute two groups of much interest. I must here remark, that in the course of my inquiries I made simultaneous observations upon the pulse of the mother. I thereby endeavoured to answer the question, whether and how far the frequency and quality of the maternal pulse as an index to the healthy or unhealthy condition of the mother, can have an influence on the life of the fœtus, and in what way it would manifest itself upon the latter. The two first-mentioned cases (4 and 5) appear to answer this question. In case 4 the mean frequency of the fœtal heart was 145; the mother was pregnant for the fourth time, and was suffering from tabes dorsalis; her pulse was on an average 92. In case 5, the mean frequency of the fœtal heart was also 145; the mother, a primipara, was suffering from chronic metritis, which was subject to occasional exacerbations; the average of her pulse was 97. In each of these cases the constant high number of the fœtal pulsations justified me in assuming the presence of a girl; it turned out, however, that both were healthy boys. Whereas, on the one hand, it would be premature to draw from these two cases the general conclusion, that disease of the mother, with quickened circulation, increases the rapidity of the fœtal pulse; yet, on the other, it would be worth the trouble, and it is strongly to be recommended, that other observations should be instituted upon this point, particularly as Hohl relates that, in the case of a pregnant woman suffering from smallpox, the frequency of the fœtal heart was 260, and six hours after its birth the infant was covered with a variolous eruption.

The group 6, 7, 8, 9, is perhaps still more interesting. The mean frequency of the heart's beats in these cases was 131, 147, 135, 136. In the two first cases a murmur in the umbilical cord was constantly present; in case 6 the child was born with the cord twisted twice, and in case 7 with it twisted once round its neck. In cases 8 and 9 an umbilical murmur was almost constantly present; at birth there was no twisting of the umbilical cord, but in both cases it was very thin. However, in all four cases, pressure upon the cord was the cause of the murmur. But that an umbilical murmur, depending upon pressure of the cord, goes along in all cases with a diminution in the frequency of the fœtal heart, as seems to be borne out by cases 6, 8, 9 (where boys were expected,

but where girls were born), is contradicted by case 7, where the conditions were reversed, I having been led from the frequency of the fœtal heart to expect a girl, but where a boy appeared. But still less should it be denied that pressure on this cord (as indeed I have had other opportunities of observing, especially during the course of labour) may exert an influence on the fœtal heart, and may be an obstacle to determining the sex of the child by the way we are now considering.

There remain now only cases 10, 11, 12, 13; cases certainly in which there appears to be no explanation of the erroneous diagnosis arrived at, except that the observations extended over comparatively too short a time.

Accordingly, the thirteen cases which I have now described may with propriety be looked upon as exceptions to the rule, and accordingly the errors in the determination of the sex of the fœtus are reduced to the last four cases, and the results of my observations speak even more strongly in favour of the law I have endeavoured to illustrate than the language I have employed at the commencement of this paper.

Finally, I may mention two cases, which have indeed nothing to do with the diagnosis of the sex of the fœtus, but which, in another point of view, are of considerable interest.

In the *first*, during the last nine days of pregnancy, in spite of all the pains which were taken, the sounds of the fœtal heart could not be heard, although during the previous three weeks they had always, with the exception of a single afternoon, been clearly recognized; accordingly, though all other signs were wanting, I diagnosed the death of the fœtus. At birth the epidermis of the fœtus was already separating, and was hanging in loose shreds from many parts of the body. I mention this case as noteworthy, because it shows, that if the sounds of the heart, which had previously been heard without interruption, cease to be audible, we have a right to consider that the fœtus has died. It is no doubt true that the sounds of the heart may disappear from time to time, though not nearly so often as is generally believed; this only happened 9 times out of my 56 cases.

The *second* is the only case in which I had an opportunity of noting the sounds of the fœtal heart at an earlier period of pregnancy than in the others, the woman having been delivered during the 34th week. Here I predicted from the mean frequency of the pulse (141) that the fœtus was a girl, and the result corresponded to my expectation; in other words, the state of the fœtal pulse even some time before its birth affords us a means of determining its sex.

I may briefly recapitulate the various circumstances which, according to my observations, may interfere with the certainty with which the sex of the fœtus may be inferred. 1. Too short a period of observation, which does not give an opportunity for detecting variations which may be considerable. 2. The last days of pregnancy. 3. Insufficient care on the part of the observer. 4. Several pregnancies. 5. Those cases where the frequency of the pulse might correspond to either sex. 6. Diseases of the mother. 7. Pressure on the umbilical cord. 8. Cases in which the differences of the pulse do not as yet admit of any explanation. It thus appears that there is still a wide field for the existence of errors in diagnosing the sex of the child.—*Edinb. Med. Journ.*, March, 1862, from *Monatsschrift für Geburtskunde und Frauenkrankheiten*, December, 1861.

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71. *Epidemic of Puerperal Phlegmonous Erysipelas at Stockholm.* By Prof. Retzius.—The new Lying-in Hospital of Stockholm was opened in May, 1858, and six months had scarcely elapsed when some cases of puerperal fever occurred, although not in rapid succession. At the commencement of 1859, the cases became more and more frequent, until they constituted 40 per cent. of the admissions, and furnished a mortality of 16 per cent. The health of the hospital improved during the summer, so that the puerperal cases only constituted 3 per cent., and the mortality was reduced to 6.62 per cent. During the months of November and December the cases rose again to 37 per cent., but the mortality kept as low as 6.9 per cent. At the commencement of 1860, the weather was very mild, and the number of admissions to the hospital were far beyond its means of accommodating. As a consequence, erysipelatous inflammations soon

manifested themselves, although no analogous form of disease prevailed in the town. At the end of February and beginning of March, phlegmonous erysipelas attacked the upper or lower extremities of several of the patients, little or no pain of the abdomen existing, although the whole surface of the body was exceedingly sensitive to the slightest pressure. The patient's powers became more and more depressed from the commencement to the fatal termination of the affection. The lochial secretion was very fetid and excoriative. Neither constitutional condition, prior disease, present debility, or the prolonged duration of labour, seemed to exert the slightest influence on the disposition to become affected by this disease. Until the end of March, only the under floor of the establishment furnished the cases, this being the part where the midwives are instructed. No woman who occupied a room alone, having a space of 2,000 cubic feet, became the subject of the disease. In a room intended for three women, with 1,500 cubic feet for each, there were placed, on account of the influx, four women, and therefore with not more than 866 feet. Seeing the impropriety of keeping women long in such a room, with insufficient means for keeping it cleaned and ventilated, it was closed against these cases. Still there were sometimes placed in it cases of the ordinary peritoneal forms of disease, which all terminated favourably. It was hoped by this closure the further spread of the erysipelas would be prevented, but towards the end of April it broke out again in quite another part of the establishment. Fortunately, the pressure of admissions became slighter, and an effectual cleansing of the rooms and material arrested its further progress. It is a curious fact, that during the residence of the infants in the establishment, not one of them suffered from erysipelas, although this is of so common an occurrence when the mother is the subject of puerperal fever. The author was, however, informed that bad erysipelas did attack several children who had been removed to the Foundling Hospital in consequence of the deaths of their mothers from this disease.

At the autopsies, nothing very remarkable was observed with respect to the abdominal viscera, or their peritoneal covering. The uterus was found in a relaxed condition, its inner surface being lined with a fetid, purulent fluid, mixed with coagula, the walls of the organ, on removal of this, being of an ash-gray colour. The substance of the organ was, to two lines depth, loose and pulpous, with the mouths of the vessels gaping. The heart was pale and flabby, coagula being contained in its cavities. There was much stasis of blood, with œdema of the lungs. On making incisions into the diseased extremities, much red serum was discharged from the infiltrated cellular tissue, to which, however, the mortification which had affected the skin had spread only in a slight extent. The muscles were of a pappy softness. The bloodvessels contained no coagula, nor did the walls of the veins exhibit any signs of inflammation, and pus was found only in the spermatic veins. The microscope showed that the colourless corpuscles of the blood existed in an unusually large quantity.—*Med. Times and Gaz.*, April 12, 1862, from *Monatsschrift für Gebürtskunde,* vol. xvii. pp. 191—197.

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72. *Treatment of Peritonitis by the Continued Application of Cold to the Abdomen.*—M. BÉHIER, at the Session of the French Academy of Medicine, April 1, 1862, reported the history of several cases of metro-peritonitis which were rapidly cured by the exclusive application of continuous irrigations of cold water upon the abdomen; and then detailed the results that have been obtained by him in the treatment of puerperal affections by the application of ice. M. Béhier applies the ice to the abdomen of the patient by means of gum caoutchouc bags filled with fragments of ice, renewing them every two hours. M. Béhier stated that since October, 1858, 801 females were confined at the Hospital Beaujon: to 355 of these females ice was applied; 244 of the patients presented merely swelling of the annexes of the uterus, accompanied with slight pain which speedily disappeared. In 68 the symptoms were of a more menacing character, with a decided febrile reaction and a commencing alteration of the patient's features. Thirty-nine of the 801 parturients died. But even in these cases, the application of the ice postponed the fatal result beyond the customary period at which it happens in cases where ice had not been applied. M. Béhier

hopes, therefore, that the employment of the ice will be a means well adapted to counteract the affection of the peritoneum which is so common an element in the diseases of the puerperal female. It seems to him to be especially applicable to cases unattended with any general affection. He remarks that, in the numerous observations he has made, he has seen no injurious results occur from the practice advocated by him—not the slightest disturbance of the lochial discharge, or of the secretion of milk.—*Gazette Hebdomadaire* for April, 1862.

73. *Broncho-Pneumonia of Lying-in Women.*—Dr. Barnes communicated to the Obstetrical Society of London (March 5) the following note. He stated that observation had long made him familiar with the fact that lying-in women were liable to a peculiar form of broncho-pneumonia. It had been generally considered that the pulmonary symptoms which arise during childbed were the consequence of the violent straining attending the expulsive stage of labour and of "taking cold." To him this explanation was far from sufficient. As in typhoid fever, so in puerperal fever, the lungs were apt to be involved. In either case the cause was similar. It was observed that a marked characteristic of typhoid fever was the extreme alkalinity of the blood. The urine he had frequently found highly ammoniacal on voiding. A similar condition commonly marked the blood in puerperal fever. On one occasion the author observed that, the bladder being partially paralyzed, and the urine consequently retained in the intervals of being drawn by the catheter three times a day, the urine decomposed so rapidly in the bladder as to evolve large quantities of ammoniacal gas, which escaped in a gurgling stream when the catheter was introduced. These circumstances, with others which need not be enumerated, indicated a dyscrasia of the blood which must produce certain irritating effects throughout the body. The diarrhœa of puerperal fever, and the diarrhœa which frequently happens in childbed apart from overt fever, were the simple effect of the irritation of the intestinal mucous membrane by the septic or other offending matter circulating with the blood. Peritonitis arose in the same way. Accompanying this diarrhœa, or apart from it, we might have broncho-pneumonia. This, in like manner, was simply the effect of the irritation of the bronchial mucous membrane or parenchyma of the lungs by the same offending matter. In some of these cases the breath of the patient had possessed an odour distinctly resembling that of the foul lochial discharges. It was by the complication of this form of pneumonic irritation that the author accounted for the fatal acceleration of phthisis after labour. This form of broncho-pneumonia was distinct from that which immediately resulted from capillary embolia.—*Med. Times and Gaz.*, March 22, 1862.

74. *Ovarian Tumour cured by Tapping (?), and followed by Two Pregnancies.*—M. L. R. Cooke records (*Med. Times and Gaz.*, April 5, 1862) the following interesting case:—

"Mrs. D., aged 28, became a widow soon after the birth of her third child, about the middle of the year 1858. Two months after the delivery she noticed a new abdominal tumour, which gradually increased (meeting with various erroneous diagnoses) until June, 1860, when it had attained a size sufficient to embarrass her respiration, and to cause her much distress, more especially as she was under an engagement to re-marry.

"Under these circumstances she applied to Mr. Spencer Wells, who diagnosed a simple ovarian cyst, and tapped her, removing thirteen and a half pounds of a viscid fluid.

"In July of the same year, finding no perceptible return of the disease, she married; and, in May, 1861, I attended her during the delivery of a perfectly healthy child. Her health has continued good up to the present time, and on her lately announcing her expectation that her next delivery will take place in the course of next month, I satisfied myself that her present condition is that of advanced pregnancy, and is not due to a refilling of the old cyst.

"These facts appear to confirm the justice, either of the theory that in simple ovarian cysts the mere operation of tapping is sometimes followed by adhesion of the cyst walls and gradual degeneration of the cyst itself, as borne out by

other published cases; or, on the other hand (looking at the short time between the operation and the subsequent pregnancy), the practice adopted by Mr. Baker Brown of following the operation by pressure, with the view of obtaining the same results.

"It appears quite possible that, on the one hand, the refilling of the cyst may have been retarded by the new direction given to the activity of the generative organs through the influence of the sound ovary; and, on the other, that a slow refilling may have been taking place, coincidently with pregnancy, until the uterine tumour had acquired sufficient dimensions to exercise a pressure adequate to promoting absorption.

"Practically, the case teaches, at any rate, this much, that, given an ordinarily favourable case for the use of the trocar—the additional facts of the patient having exhibited a recent aptitude for conception, being married, and being within the child-bearing period, may often constitute an inducement to us to perform the operation with some hope of putting a period to the disease."

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75. *Intra-Uterine Convulsions.*—Dr. JAMES A. SIDEY read to the Obstetrical Society of Edinburgh (January 16, 1861) the following notes of a case of what he might call "intra-uterine convulsions:" Mrs. T., æt. 40, a delicate, weakly woman, sent for me about 11 A.M. on the 10th of April, 1860, to attend her in her eleventh pregnancy. I found her in labour, with the os fully dilated and the pains strong—the head presenting in the third position. A few pains brought the head so low down that it pressed on the perineum; but for two hours there was no farther progress made, although the pains were strong and forcible. As the four previous labours in which I had attended her had been very easy, I did not understand why the head still remained about the same place, especially as I could introduce my finger all round the pelvis; but on inserting my hand I discovered the hand of the fœtus hitched on the pubis. This I relieved with some difficulty, and a strong pain coming on, the child, a male, was born at 2 P.M. During labour the movements of the fœtus were very violent, leading me to suppose that it was convulsed. The patient did well. On examining the child it presented the appearance of being well grown and at the full period, but its arms were bent on its chest, with the elbows slightly extended from the sides, and the fingers drawn together like a cone. I attempted to pull the arms down, but could not with the amount of force I thought justifiable. The child cried lustily, and got on very well for a short time, when twitchings of the muscles generally came on, which soon ran into convulsions. In this state, ever twitched or convulsed, the child lived for seven months, when it died much emaciated. No treatment seemed to be of the slightest service except turpentine and cannabis indica, which had an evident effect in preventing the convulsions—one fluidrachm of sol. mur. morphia, given accidentally, only produced sleep for one hour. The child died on 26th November, 1860.

Previous to her confinement, the mother told me that she was certain that the child would be ill, as she had experienced the same sensations as she had felt in her fifth and seventh pregnancies—these children, a boy and a girl, having been born with the same disease (the one lived six, the other fourteen months). She said that after the seventh month, on each of these occasions, she could not go out in consequence (as she described it) of "shakings in her inside," which were so severe as to make her "feel as if her inside would come out." Her third child died of acute hydrocephalus at the age of six years.

Post-mortem examination was made by Dr. Sanders, who has kindly furnished me with the following notes: The body was greatly emaciated. The arms were in a peculiar position, being tightly drawn up; the forearms rigidly flexed upon the arms, so that they could not be straightened; while the hands were clenched, and the thumbs bent in towards the palms. The right leg was also contracted. The leg was flexed upon the thigh till the heel touched the buttock. The head was not larger than natural. On opening the cranium, a considerable amount of serous effusion was observed under the arachnoid, filling up the sulci. On section, the cerebral substance was of natural consistence, but the gray matter was paler than usual and apparently infiltrated with serum. The lateral ventricles were found much distended, and filled with serous fluid to the amount of

about ℥iij in each ventricle. On examination the lining membrane of the ventricles was found much thickened, especially in the posterior and descending cornua. There was no tubercular deposit either in the ventricles or on the surface of the brain. The other organs of the body were not examined. The thickened lining membrane of the ventricles, viewed under the microscope, showed a number of compound granular corpuscles.—*Edinburgh Med. Journ.*, January, 1862.

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76. *Pathogeny of Retro-Uterine Hæmatocele.*—Prof. BRAUN has reported ten cases of retro-uterine hæmatocele, and the following are some of the conclusions at which he has arrived: 1. In the ten cases, the diagnosis was made with certainty in eight, and with probability in two. Nine of the patients recovered perfectly; in the fatal case there were extra-uterine pregnancy and obsolete peritonitis. In seven cases, the indications afforded by exploratory puncture were very encouraging. Puncture and entire evacuation of the tumour were followed by cure in six cases; in three, recovery took place under passive treatment. In six cases, the hæmatocele was retro-uterine; in four, antero-uterine. In none of the cases did the extravasation surround the uterus: it was always confined to one-half of the pelvis. 2. Rapid cure may follow the emptying of the hæmatocele by puncture; the fertility of the patient is not destroyed; and a subsequent pregnancy and parturition may follow their normal course. 3. Movable pelvic tumours, which careful palpation and examination show to be probably hæmatoceles, are recovered from under or after inunction of iodine and glycerine. 4. The quantity of blood contained in a uterine hæmatocele may vary from a few drachms to several pounds. 5. The blood extravasated in the neighbourhood of the uterus undergoes a metamorphosis; the corpuscles become broken up, and their membranes appear flabby and eroded; they do not undergo putrefaction, and immediately after evacuation do not bruit a putrid smell. When the hæmatocele is of long standing, dark brown spots are formed on its walls; the blood-corpuscles are absorbed, and a greenish-yellow fluid is left, having the specific gravity of the blood-serum, with an alkaline reaction, and containing albumen, a very large amount of albuminate of soda, a little biliverdin, no ammonia, very little sugar, but the salts of the blood-serum, with a preponderance of the chlorides. The fluid removed by the trocar from a hæmatocele generally contains blood of a tarry, ropy consistence, not of bad odour, with numerous patches of pigment, and with hæmatin; it also contains crystals of ammonio-phosphate of magnesia. 6. During the existence of a hæmatocele, menstruation sometimes runs a normal course, without pain; sometimes it is very profuse and painful, and is generally attended by enlargement of the blood-cyst; sometimes hæmatocele exists coincidently with menorrhagia of several months' duration. Intense anæmia is generally only observed where the hæmatocele is complicated with menorrhagia; without this, its presence is compatible with the retention of a healthy colour of the face. 7. The growth of a hæmatocele is sometimes slow, sometimes very rapid. It may in a few days attain the size of a man's head; and in this case the symptoms are generally those of an internal hemorrhage. 8. Some days after the emptying of a hæmatocele, the exudation acquires a penetrating odour, which may be removed by careful injection of the cyst with warm water. 9. Menorrhagia occurring in conjunction with a hæmatocele soon ceases, as soon as the hæmatocele is perfectly emptied. 10. Prolapsus of the vagina may be produced by hæmatocele, with or without the presence of pregnancy. 11. In the highest grade of antero-uterine hæmatocele, the tumour reaches downwards lower than the orifice of the urethra, and upwards as far as the umbilicus. 12. The bladder and uterus are generally pushed upwards by the tumour, more frequently forwards, rarely backwards and to the side. The direction of the displacement may be ascertained by careful catheterization. A hæmatocele projecting into the vagina is not reduced in size when the bladder is emptied by the catheter. 13. Hæmatocele may be induced by extra-uterine pregnancy, when apoplexy of the ovum and extravasation of blood takes place. 14. Secretion of milk appears not to accompany hæmatocele, unless pregnancy be also present. If there be lacteal secretion in a case of hæmatocele, when the uterus is evidently empty, there is

probably an extra-uterine pregnancy. 15. Extra-uterine blood-tumours occurring during pregnancy may fill nearly the whole pelvis, and, lying behind the urethra, may produce the same troubles as vaginal cystocele or hernia of an ovarian cyst into the vagina. 16. Exploratory puncture forms the only absolutely sure means of diagnosis between ovarian tumours and uterine hæmatocele. —*Ranking's Abs.*, vol. xxxiv., from *Wiener Med. Wochenschr.*, Aug. 31, 1861.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

77. *Additional Experiments on the Poisonous Effects of Coal Gas upon the Animal System.*—Dr. C. J. B. ALDIS, in a paper read before the Royal Medical and Chirurgical Society a short time ago (see No. of this Journal for April of this year, p. 568), communicated the results of his experiments made with the coal-gas as it issued from the main; he has since (March 11th) narrated some experiments made with common gas diluted with atmospheric air in different proportions. The experiments were made with Mr. Henry Banister, on February 7 and 14, 1862. In the first experiment, common gas and atmospheric air, in equal proportions, were administered to a rat placed under a glass vessel. The head dropped in one minute, and it became insensible, with slight convulsion, in one minute and a quarter; the respiration was hurried, the eyes staring, and spasmodic jerking of the body, followed by death in two minutes and a half. The post-mortem appearances were similar to those already described, except a darkish patch on the anterior part of the pleura of the right lung, like that produced by smoke. The second experiment was made with one-fourth common gas and three-fourths atmospheric air. The respiration of the animal became hurried in three minutes, the head dropped in five minutes, and death occurred in eleven minutes. During the autopsy, a smoky-looking spot was seen on the pleura. In the third and fourth experiments, the proportion of gas to air was one-fifteenth. The former experiment was not sufficiently prolonged to show the deadly influence of the gas in this diminished quantity; but in the latter the rat soon began to pant, and the head fell in ten minutes, springing of the body was observed, with twitching of the ear, followed by coma in seventeen minutes. The eyes were open, the respiration became laborious in forty-one minutes, when death ensued. The surface of the skull was intensely red; the brain congested; the blood very fluid and bright-coloured; the pleura of a bright red colour, and the right side of the heart distended with darkish blood.

Dr. Hodgkin said that as illustrating the condition under which miners were often unfortunately placed, the experiments were very valuable, but they did not show whether the coal-gas acted as a poison, or whether the death might not be due to the absence of oxygen. He (Dr. Hodgkin) then referred to some experiments of the late Mr. William Allen. He placed animals in an atmosphere containing hydrogen and oxygen. It was found that death took place, not because they were poisoned by hydrogen, but because they consumed the oxygen, breathing at length hydrogen and carbonic acid.

Dr. Wynn Williams said that in the year 1857 he had had under his care two cases of poisoning by coal-gas. One of the patients died. The patients were two sisters, old women. They went to bed one evening between eight and nine, and as they did not get up at the usual time next morning, their bedroom window was broken open. They were both found to be unconscious. One of them recovered. She said that all she remembered was waking in the night, and hearing her sister get up. Soon after this she became insensible, and remembered nothing more. She suffered a great deal from muscular rheumatism, and afterwards had rheumatic fever. The patient who died remained in a comatose condition for forty-eight hours, and then became partially sensible; but in three or four days she again became comatose, and occasionally violent, and at length died. Dr. Williams said that at a previous meeting he had understood that Dr. Kidd expressed an opinion that the effects of chloroform and coal-gas

were alike. The symptoms in the case he had related were different to those generally found in poisoning by chloroform.—*Med. Times and Gaz.*, March 29. 1862.

78. *Connection between Poisoning by Phosphorus and Fatty Degeneration of the Liver.*—Dr. Lewin, of Berlin, has lately directed the attention of the profession to the curious fact that there is an evident connection between poisoning by phosphorus and fatty degeneration of the liver. He was led to this discovery by finding in the published reports of cases of poisoning by phosphorus, in which autopsies had been made, statements regarding an alteration of the liver. He then experimented upon dogs and rabbits, and found that we may, by administering small doses of phosphorus which do not immediately kill, cause fatty degeneration of the liver, with destruction of the acini, that is, a condition closely analogous to that which is found to exist in cases of acute atrophy of the liver. He also discovered that poisoning by phosphorus produced a peculiar affection of the kidneys, and rendered the urine albuminous as long as life continued.

These physiological experiments were soon afterwards shown to be perfectly correct by a case of poisoning by phosphorus which occurred in the clinique of Professor Frerichs, in the Charite Hospital. A servant girl committed suicide by eating the tops of a thousand lucifers; when brought into the Hospital she suffered from icterus and enlargement of the liver; the urine contained biliphæin and albumen. She died shortly afterwards without having had much pain, and no symptoms of a disturbance of the nervous system having been observable. The post-mortem examination, which was performed with the greatest care, showed that the blood was in a state of dissolution, it had the colour of cherry juice, was very thin, and no coagula, and scarcely any globules were found in it. The skin and the mucous membranes were suffused with blood, the liver was greatly enlarged, and its edges blunt. On being examined by the microscope. the acini appeared to be filled with fat to bursting.—*Med. Times and Gaz.*, May 3, 1862.

79. *Poisoning by Aniline and by Nitro-Benzol.*—George L., aged 16, was brought to the London Hospital on June 8, 1861, in a state of insensibility. The general surface of the body was pallid and cold; the lips, buccal membrane, face, and nails, were of a deep purple colour. The pulse was slow and scarcely perceptible, and the apex beat of the heart very feeble. He had vomited several times before admission, and was now just sufficiently conscious to complain of pain and swimming in the head. He smelt strongly of coal-tar. It appeared that he had been found in a state of insensibility in the interior of a vat used in the manufacture of aniline, which he was engaged in scrubbing. All his clothes, which were strongly impregnated with the peculiar odour, were removed; he was placed in a warm bed, and some hot brandy and water and a dose of camphor and ether were administered. When the patient had rallied a little, his body was well washed with soap and water, to prevent any further absorption from impurities adherent to the skin. On the following day, the patient was still rather blue, and complained of weakness, and his breath still smelt strongly of aniline. These symptoms gradually passed off, and a few days afterwards, being quite well, he left the hospital.

This is the first case of poisoning by aniline placed on record, and it differs in many respects from the recent case of poisoning by nitro-benzol, which occurred at the same chemical works. Through the courtesy of Mr. Fletcher the following facts have been ascertained concerning the death of the lad from nitro-benzol: He was employed, it appears, in the laboratory, and finding that a siphon did not act properly he thoughtlessly sucked through it some of the fluid (nitro-benzol), which he wished to transfer from one vessel to another. He did not, however, attach any importance to this act until some time afterwards, a circumstance which shows that gastric uneasiness was not immediately produced.

Mr. Fletcher noticed in the morning that the lad did not look well, but, on being questioned, the boy said that he felt "quite well, only sleepy." When he

went home he told his mother that he felt "as though he were drunk." It was then that he first mentioned his imprudence with the siphon. He ate very little for dinner; the stupor became gradually more profound till it was impossible to rouse him, and he died at ten o'clock P. M., about twelve hours after swallowing the nitro-benzol. It is stated that neither vomiting or convulsions occurred.

Dr. Letheby, under the order of the Coroner, made a post-mortem examination of the body, and his observations, about to be published, will be anxiously desired by the profession.—*Med. Times and Gaz.*, March 8, 1862.

80. *New Mode of Detecting Minute Traces of Morphia.* By M. LEFORT, of Paris.—It is often very necessary to determine whether a substance contains certain alkaloids, and hence a process capable of accurately distinguishing between them has always been a desideratum. Lately, M. Lefort, a pharmaceutical chemist in Paris, has established: 1st, that when organic matters decompose iodic acid, the iodine set free is generally absorbed by caustic ammonia, and the mixture is completely decolourized; 2d, that, on the contrary, morphia, which is decomposed by iodic acid with the production of a red or brown colour, acquires a much deeper colouration on the addition of ammonia.

These reactions are very delicate, being capable of indicating the presence in a solution of a ten-thousandth part of morphia. The experiment is very readily performed by dipping unsized paper several times in the solution, and drying it each time; ultimately there is deposited upon the paper a quantity of solid morphia, sufficient to give, in a very characteristic manner, the reactions of this alkaloid with nitric acid, perchloride of iron, and finally with iodic acid and ammonia. This method of procedure presents, particularly in medico-legal investigations, the advantage over that which consists in experimenting on the solutions themselves, of preserving the *corpus delicti*, modified, it is true, by the chemical agents, but capable of being kept for a long time without alteration. The reaction with the salts of the sesquioxide of iron presents, when unsized paper is employed, this peculiarity, that the colour is no longer blue or green, as in the case of the solution, but that it is always green, and that the shade is so much the deeper, according as there is more of the alkaloid in proportion to the salt of iron. The paper on which the reaction is obtained may be kept for a long time without alteration. This reaction of the salts of the peroxide of iron with morphia is the more important, as no other alkaloid behaves with them in the same manner.—*Ed. Med. Journ.*, December, 1861, from *Gazette Hebdomadaire,* Nov. 1, 1861.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Case of Opium Poisoning in which Belladonna was successfully used as an Antidote. By W. S. Duncan, M. D., of Brownsville, Pa.—At 7 o'clock A. M., on the 21st of May, 1862, Mrs. C., aged 38, swallowed with suicidal intent two ounces of laudanum. I first saw her an hour and a half after the poison had been taken; found her with flushed face, contracted pupils, and stertorous respiration; pulse 70, full and strong. She was almost insensible to external impressions, and when aroused by violent shaking and loud speaking immediately sank back into a comatose sleep. A stomach-pump not being at hand, I administered, immediately, zinci sulphas, ipecac. pulv. āā gr. xx. This producing no effect in ten minutes gave zinci sulphas gr. xii, ipecac. pulv. gr. xx. There being no effort at vomiting in ten minutes more, gave antim. et potass. tart. gr. iii, which in ten or fifteen minutes was followed by slight emesis. A half pint of warm water was then given and the fauces freely irritated with a feather, after which a pint of dark matter was ejected which smelled strongly of laudanum. During the next hour and a half she took tinct. belladonnæ f℥j in divided doses. At 12 o'clock M., she was insensible to external impressions of any kind; pupils contracted to a mere point; whole surface cool and covered with clammy perspiration; unable to swallow fluids; countenance pale; pulse thready and feeble—almost imperceptible. Gave per rectum ext. belladonnæ gr. iii, warm water f℥iss. 2 o'clock P. M. No change. Repeat belladonna injection. Cold water to head, warm bricks to feet, and whole surface rubbed with dry flannel. 4 o'clock. No perceptible alteration. Repeat belladonna injection. Continue cold water to head and warm bricks to feet. 6 o'clock. Surface dry, extremities warm. Otherwise condition about the same. Repeat belladonna injection. 9 o'clock. Breathing somewhat easier; pulse 100, with a little more force. No other change. 12 o'clock, midnight. Still insensible; whole surface warm and dry. Ext. belladonnæ gr. iii, warm water f℥iss per rectum.

May 22, 2 o'clock A. M. Pulse 96, full and strong; pupils slightly sensible to light; breathing more natural; pungent heat of whole surface. Ext. belladonnæ gr. ii, warm water f℥j per rectum. Whole surface sponged with cold water. 3 o'clock. Pupils slightly dilated and sensible to light; breathing nearly natural; patient begins to be restless, tosses her arms about and turns frequently in bed; occasional muttering; answers questions but not always correctly. Half an hour later she started suddenly up in bed and asked for a drink of water. Pupils largely dilated; pulse 90, full and strong; and patient complains of an intolerable itching over the whole surface, which is warm and dry. Says she cannot see distinctly, and "sometimes there are two candles where there should be one;" nearly rational, though when left to herself her mind seems to wander. Whole surface sponged with soda bicarb. ℥iss, aqua Oij. 10 o'clock A. M. Still complains of the itching and dimness of vision; pupils large; tongue dry

and fauces red, but no redness of the skin, as is sometimes seen in belladonna poisoning; has passed urine. ℞.—Hyd. chlor. mit. gr. x; jalap. pulv. gr. xii. The cathartic failing to operate, at three o'clock an injection of warm water was given; in half an hour after the bowels acted freely and the patient was well.

In addition to one ounce of tinct. belladonnæ first given, twenty grains of extract were administered per rectum.

I instituted no subsequent experiments to ascertain the efficacy of the belladonna preparations used, though when consciousness returned the patient was fully under the influence of the drug, and without some antidote the dose of opium was surely sufficient to have produced death.

Clover-Hay Tea in Hooping-Cough.—Dr. CONDIE, of this city, informs us that in consequence of seeing, in the recent medical journals, a notice of the efficacy of a strong tea made from trifoil or clover-hay in allaying the spasmodic cough of pertussis, he was induced to try it. He gave it in three cases to children labouring under very severe attacks of the disease. His only direction was that the tea should be made very strong, and, when cold, given in large silver spoonful doses several times a day. In every one of these cases the parents assured him that, very soon after commencing with the tea, a marked amelioration of the spasmodic cough occurred. In one of the cases it was entirely suspended after the use of the clover tea for some forty-eight hours.

Prolonged Abstinence.—[The following interesting case of prolonged abstinence in a cat has been communicated to us by our friend, GEORGE ORD, Esq. Mr. O. is well known as an eminent naturalist, and as a most careful and accurate observer. No doubt can be entertained that the animal was wholly deprived of all food and drink for twenty-one days. Cases in which life was maintained after even more prolonged deprivation of nourishment, will be found related under the head of *Abstinence*, in the *American Cyclopædia of Practical Medicine and Surgery*:—]

June 22, 1862. On the 15th of May, ultimo, whilst we were getting in wood, a cat secreted himself in my cellar. The animal was not discovered until the 5th of this month, when he was found, by his groans, lying in a corner, and so exhausted for the want of nourishment that he could not rise. I feel confident that there were neither rat nor mouse in the cellar, nor anything to sustain life; and certainly no fluid or water. I have carefully sustained this animal, with fresh meat and milk, until the present time, and he now appears to be perfectly recovered; although for upwards of a week he could not move about except in a tottering gait. For the first three or four days I was compelled to support him when he was feeding. He is a *castrato*, and is streaked like a tiger. The expressions of gratitude of the poor animal for our kindness to him are remarkable.

Case of Monstrosity. By L. W. BAKER, M. D., of Berlin Cross Roads, Jackson County, Ohio.

On the 28th of June last I was called to see Mrs. McC., who was in the eighth month of her sixth pregnancy. Abortion had commenced twelve hours before my arrival, and on examination I found the breech presenting. In about three hours the membranes had broken, and the body was born leaving the face in the hollow of the sacrum, without an incident occurring worthy of note or sufficient to excite my suspicions of

there being anything unnatural. At this time the heart was acting strongly, but upon a return of the pains for the expulsion of the head, I perceived a faltering in its action, and fearing compression of the cord, I introduced my finger in the usual manner for bringing down the head, but was somewhat disconcerted in not finding a mouth where I thought one should be. I however succeeded in finding one, and soon brought the two. faced creature into the world.

Its general appearance was much like that which was reported by Prof. Meigs in 1857, but differed from it in having four eyes, two noses and mouths all well formed and symmetrical. To outward appearances the faces were much as if two perfect ones had been cut in two by a line extending from about half an inch from the infra-maxillary symphysis through the superior maxillary bone and orbital process of the malar of the same side, and the two larger portions united together, which caused the two faces to look nearly at right angles from each other, while the facial axis of each, if extended, would have crossed about an inch and a half below the chin. Two ears were perfect, but the other two were lost, save a small tit-like projection looking from above downwards, and situated in the line of union on a level with the superior border of the upper lips. There were four palpebræ with a double os frontis and three fontanelles. Beyond the corneal suture there were no additional bones that I could define. The whole posterior portion of the head was large and well developed, a horizontal section of which would have been nearly circular, while the upper portion was much of the sugar-loaf form, and the whole combined appeared to be about one-third larger than a natural head.

The sex was intended to be that of a female; the labia pudendi were natural, but the clitoris was enlarged almost to the size of a penis.

The monster gasped twice, opening both mouths and all four eyes simultaneously, and after two short convulsions it expired. A post-mortem was denied.

Syrup of Triticum Repens in Irritable Conditions of the Urinary Bladder. By the Editor.—The attention of the profession has been lately called by Mr. Henry Thompson, of London, to the remedial powers of an infusion of *Triticum repens* in irritable conditions of the bladder. (See No. of this Journal for January last, p. 217.) Having very recently had under treatment two cases of this troublesome complaint, the sufferer in one being a lady and in the other a gentleman, to both of whom we had been giving the syrup of uva ursi with less relief than we had usually found that remedy to afford, we determined to try the *Triticum repens*. With this view we directed an apothecary to prepare a saturated infusion of this plant by displacement, and then by the addition of a sufficient amount of sugar to make it into a syrup. This syrup we directed our patients to take in doses of a teaspoonful four or five times a day. After a few days, both reported that this preparation had afforded them more marked and speedy relief than the previous medicine had done, and they likewise considered it a much more agreeable remedy. The syrup we found, indeed, to be quite pleasant to our taste, and we recommend it as a convenient and efficacious mode of administering this article.

DOMESTIC SUMMARY.

Case of Poisoning by Laudanum—Belladonna used as an Antidote.—Dr. JAMES BLAKE records (*Pacific Med. and Surg. Journal*, April, 1862) the following case:—

"G. B., æt. 4 years. Had been sick for three weeks from measles, followed by pneumonia. Was taking a preparation of quinia and iron with nitric acid, and for two days had been improving, although still very weak.

"On the morning of April 8th, I was called to see him at 5.30 A. M., his father informing me that he was fearful he had given him a teaspoonful of laudanum, by mistake, instead of his medicine. When I arrived I found him insensible, not capable of being roused, breathing very heavily; he had already taken ten grains of ipecac. before I saw him, but now was incapable of swallowing; pupil contracted to a point; skin warm; pulse 100, rather small. After waiting a short time, to see if he could be made to swallow some sulphate of zinc, I sent for some of the fluid extract of belladonna, and going myself to get a stomach-pump, I requested a physician who was in the house to administer three drops with a little water, as an enema, as soon as it arrived, and to repeat the dose in twenty minutes, should the pupil still remain contracted. The medicine did not arrive until near a quarter past six, by which time the breathing had become quite stertorous, and the child was becoming black in the face.

"On returning at 7 A. M., I found the child quite sensible, wide awake, asking for drink, and the only apparent effect of the laudanum was that he seemed rather sleepy. I was informed that ten minutes after taking the enema the breathing became more natural, the expression of the countenance improved, and that twenty minutes after the injection he roused up and asked for water. The child was so much improved that, although the pupil was still contracted, the second enema had not been given.

"A further attempt was made to produce vomiting, by giving sulphate of zinc, and warm water and mustard, but unsuccessfully; and, as the stupor seemed to be again coming on, I gave a drop of the extract in water by the mouth, and two teaspoonfuls of castor oil. The stupor still increasing, and the hands and feet becoming cold, another enema, containing three drops of the extract, was administered, the extremities being kept warm by artificial heat. At this time, the respiration had fallen to eight in a minute, the lips becoming dark. In five minutes after taking the enema, the respirations were twelve in a minute, and in a quarter of an hour were sixteen, the expression of the face becoming more natural. The child could now be easily roused, took some drink, and was constantly rubbing its nose; pupils still contracted. Stupor again came on, and another enema was given, with three drops of the extract, and, being obliged to leave, I directed two drops of the extract to be administered every half hour until the pupil should dilate.

"On returning at 11 A. M., I found the child evidently affected by the belladonna; face flushed; skin moist; pulse soft, but full; respirations eighteen in a minute. Three enemata had been administered. Consciousness had been perfectly restored; complained of dryness of the throat; had taken some egg and brandy. The pupil had expanded a great deal, but still rather small. Mucus was collecting in the bronchial tubes and trachea, and seemed to interfere considerably with breathing. There was constant movement of the tongue, caused apparently by twitching of submental muscles. No attempt at coughing was made, although the child was strong enough to sit up, and to change its position, it appeared as if the reflex sensibility had been destroyed. Discontinued the use of the belladonna, and gave enemata with turpentine and castor-oil, until the bowels were moved.

"2 P. M. Flush had gone off the face; pulse not so full, about 100; pupils more dilated, about natural. The bowels have not been moved, although two enemata, with castor-oil and turpentine, have been given, and two with soap and water. During the last half hour, has been more drowsy; respiration twenty-four; evidently considerable secretion in the air-passages, and no effort

to cough; at present cannot swallow. Ordered enema, with croton-oil and turpentine; but the child evidently sinking from asphyxia. The bowels were moved at 3 P. M., but the child died asphyxiated at 4.40 P. M., or about thirteen hours after taking the laudanum.

"I have reported this case, although terminating fatally, in order to call the attention of the profession to the use of belladonna as an antidote to poisoning with opium, and, *vice versâ*, of opium as an antidote in poisoning with belladonna. From the marked relief afforded by the administration of the belladonna, and from the power it exercised on each repetition in rousing the child from a state of coma, it is evident that it exerts a specific influence over some of the worst symptoms produced by opium. The return of insensibility, both mental and organic, was well marked, and was renewed at each dose of the medicine. Unfortunately, the reflex susceptibility of the mucous membrane of the air-passages to stimuli, seemed to be diminished, as the child made no effort at expectoration after it was once fully under the influence of belladonna. Owing to the copious secretion caused by the subsiding pneumonia, the air-passage soon became so loaded as to prevent respiration. Had this not been the case, and had the child possessed a little more strength, I have no doubt but that the case would have terminated differently; in fact, so far as the symptoms of opium poisoning were concerned, they were entirely relieved. The quantity of belladonna administered was not very large, about eighteen drops of Thayer's Fluid Ext. My object was to give as little as possible, being afraid about expectoration."

On the Non-Shortening of the Supra and Infra-Vaginal Portion of the Cervix Uteri.—Dr. Isaac E. Taylor, Professor of Obstetrics, &c., in the Bellevue Hospital Medical College, has published (*American Medical Times*, June 14, 1862) some very interesting investigations relative to this subject.

"It is a conceded and recognized fact," he observes, "that great physiological changes in the uterus take place during gestation, that its walls become thicker, softer, and more elastic, and during this period that it undergoes no alteration of shape, although its cavity is considerably enlarged. It is, however, supposed, and in this most authorities agree, that the cervix uteri undergoes what is technically called shortening, or 'the behaviour of the cervix during pregnancy;' and that at the termination of utero-gestation the vaginal portion no longer forms a conical projection in the upper part of the vagina, but that it is then considered as having merged or moulded itself into the body of the uterus, forming one cavity. Much importance is usually attached in works of forensic medicine and obstetrics to the changes of the cervix uteri, in relation to the time of pregnancy, its colour, its softening, and its shortening.

"The progress of this shortening has been computed by the gradual disappearance of its intra-vaginal portion. Thus it is held that at the sixth month one-quarter is lost, at the seventh month one-half, at the eighth month three-quarters, at the ninth month to have entirely disappeared.

"Entertaining entirely different views on this subject, I have presumed to dissent from the opinions of these authors, not only that the neck expands from above downwards, but from the opposite one that the changes occur from below upwards."

The subject is one of great physiological and obstetrical interest, and has many important practical bearings, and Dr. Taylor has endeavoured by careful investigations to elucidate it.

Dr. T. states that "during a service of four consecutive months, in the Bellevue Hospital, as well as in the Island Hospital, in the spring and summer of 1861, and also during a short service in the fall and winter, in the presence of the house staff and several medical gentlemen and students, not less than upwards of one hundred and fifty patients have been examined by the touch and speculum, at various periods of gestation, from seven months to the full time, and during the first stage of labour in some of the patients. Nearly all, however, were the completion of pregnancy." * * *

"The examinations of the patients were made by the touch, horizontal and dorsal position, and by various kinds of specula—the glass, black-coated speculum preferred—and the records taken by the house staff, and several of the cases

were delivered the same day, or one or two or three days after; and in many instances the infra-vaginal portion of the cervix was longer instead of being shorter."

The following conclusions are drawn by Dr. Taylor from his investigations:—

"1. The cervix uteri, supra and infra-vaginal portion, does not unfold or lose itself during gestation in the body of the uterus, and the cervix uteri become obliterated at the full term of pregnancy, as Baudelocque, Gooch, Dewees, Meigs, Montgomery, Bedford, and others believe.

"2. That the cervix uteri is not lost or merged into the vagina, by dilating from below upwards, and become obliterated at eight to eight and a half months, as Stoltz, Chailly, and others believe, but remains of its natural length, and is sometimes longer.

"3. That the whole cervix uteri, supra and vaginal portion, remains intact up to the full term of pregnancy, and sometimes during the first stage of labour.

"4. That the shortening, as it is termed, is only apparent to the touch, consequent upon the ramollissement and physiological hypertrophy that take place during gestation, the cellular tissue becoming infiltrated by the changes incident to pregnancy, and hence its breadth is greater than natural, and softer.

"In multiparæ, where laceration of the os uteri has taken place on one or both sides, and the glands were also diseased, the labia are everted and the os patulous, the same as is noticed in many cases of cervical leucorrhœa, and hence the finger can be introduced at the seventh, eighth, or ninth month, to the internal os, and touch the membranes of the child, and, should the cervix have undergone a more perfect softening, the os and cervix may be dilated a half to three-fourths of an inch in diameter, though the whole cervix remains, supra and infra-vaginal portion.

"5. That in primiparæ, the finger cannot be introduced into the external os uteri: but in very exceptional cases, it may reach half way through the cervix.

"6. That the external os is always felt first, and not, as some have supposed, the internal os.

"7. That the secretion of the cervix uteri, which forms the so-called plug, does not remain to the full term, but is changeable from time to time.

"8. That the more perfect the softening the shorter the labour.

"9. That when labour sets in, especially in a primipara, the cervix (even if obliterated, and the os the size of a five-cent piece) can be clearly defined from the body, by the difference it presents to the touch of the thick, round, and soft portion of the body, and the tense thin membranous neck, and os.

"10. That after labour in primiparæ, if the neck has not been lacerated, the cervix uteri will return, supra and infra-vaginal portion, to its natural length very soon, though it is patulous and soft.

"11. That these propositions are also corroborated by cases where the complete separation of the vaginal portion of the cervix has occurred, and which could not have taken place if the neck was fully obliterated at term (case in Bellevue Hospital), also in cases of excessive œdema of the cervix, where the neck is one and a half to two inches in length.

"12. That from the investigations made during life, at various periods of pregnancy, at full term, and during the first stage of labour, and on post-mortem examinations, the cervix uteri does not undergo any shortening or expansion of the supra or infra-vaginal portion, but retains its whole length, and only becomes expanded or dilated at the commencement of labour, the cervix serving as an intermediate channel, or canal, between the body of the uterus and the vagina; this dilatation is effected through the combined operation of the softened condition of the neck, and by the pressure of the liquor amnii and the descent of the child's head or body, the internal os being the first to yield. The expansion thus beginning slowly, tends downwards towards the external os, and then the walls of the cervix are gradually expanded and unfolded for the passage or exit of the child; no better or more perfect illustration can be adduced, than the gradual expansion of the horse's anus during an evacuation, and its contraction after an evacuation occurs. Some of the cases of labour in the hospital have illustrated the same facts; during the first stage of confinement, while the membranes have been protruded through the os tincæ, only a half inch in diameter, the child has been delivered soon after."

Body Transfixed by a Bayonet; Recovery.—Dr. B. J. D. Irwin, Medical Inspector 4th Division Army of Ohio, U. S. A., relates (*American Med. Times*, May 17, 1862) the following remarkable example of this:—

"In the early part of February, 1861, the various tribes of Apache Indians, inhabiting the mountainous regions of Arizona, broke into open hostilities against the government, perpetrating atrocities and unheard-of cruelties upon the unfortunate white settlers, and torturing their luckless captives in the most barbarous and cruel manner. Unfortunate prisoners were starved, others tied up for slow target practice, and some were hung up by the feet and broiled to death by fires built beneath their subverted heads! It was during the enactment of this ferocious crusade, that the following interesting case came under my supervision.

"A small party of our troops were hemmed in, in one of the gorges of the Chirricahui Mountains, by superior numbers of Indians, who were endeavouring to capture our slender force. We held some prisoners of theirs as hostages for the safety of some citizens in their possession, whom we desired to exchange. On a certain occasion, the prisoners in our possession made a simultaneous attempt to break away from our guards. One robust athlete, aged about 25 years, was knocked down by the sentinel by a blow from a musket on the back of the head, and *held pinned to the earth by a bayonet which transfixed his body*. The weapon entered the abdomen in the anterior upper angle of the left hypochondriac region, passed directly backwards and downwards, and made its exit a little below the posterior corresponding space, about two inches from the vertebral column. The victim was held in that position for some moments, until succour arrived to secure him and his desperate associates. A paroxysm of momentary weakness was all that appeared preternatural in him. The amount of hemorrhage was very slight, and the man did not present any of the symptoms to be expected from so serious a lesion. He was tied and placed on his back; kept strictly quiet, and the cold water dressing applied—*snow-water* was used from necessity. The diet allowed was of the sparest kind. Not a bad symptom appeared, and on the *fourth day* the wounds were perfectly healed by adhesive inflammation. He complained but little of any pain or distress, which I attributed to the innate pride of his stoical character; being a brother of the chief of his tribe, he held it beneath his dignity to manifest any external show of physical or moral suffering. On the ninth day he walked to the place of execution, where he, with five of his companions, was hung to the boughs of two stately oaks, overshadowing the graves of some fourteen of our citizens, whom the savages had treacherously and cruelly tortured to death while prisoners in their hands. As we were desirous of making a lasting example to our treacherous foes, the bodies were allowed to remain suspended permanently, which prevented my making a post-mortem examination of the body of the one whose case I have described."

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Inversion of the Uterus of Thirteen Years' Standing reduced by a Novel Method.—Dr. E. Noeggerath, of New York, relates (*American Med. Times*, April 26, 1862) a case of this in a lady 38 years of age, in whom the accident occurred in her first labour on the 16th of April, 1847. Two unsuccessful efforts were made in 1848, to restore the uterus, and after this the treatment was restricted to the use of astringent injections to control the flooding. In February, 1860, the patient was first seen by Dr. N., who, having satisfied himself by careful examination of the existence of chronic inversion of the uterus, he proposed to attempt to restore it, to which the patient reluctantly consented.

On the 4th of March, 1860, Dr. N. having placed the patient in the position for lithotomy, and placed her under the influence of chloroform, first attempted reduction by the method proposed by Dr. White, of Buffalo. This failing, he was about to desist from further attempts, when the idea struck him of trying a different plan of manipulation. He applied his hand in such a manner "that the fore and middle fingers grasped the right section of the tumour; while the thumb was implanted on the left side at a point where the upper two-thirds of its length met the lower one. In this manner, a pressure was exerted by the thumb on the lateral border of the body of the womb, which pressure took an

upward as well as a lateral direction, and resulted in the formation of an oblong groove, the long diameter of which pointed below towards the left horn of the uterine fundus, and upwards to the spot where the inverted and the non-inverted portion met on the left side. The object of this first step of the operation was to completely double up the uterine cavity, so that the right—now inner—wall touched the left one. After this was completed, the dimpled portion was carried upwards by the thumb, and in doing so it could be observed that the right side of the upper section of the inverted cervix passed first of all through and beyond the os uteri. During the progress of this manipulation, the right lower section of the uterine body followed, and reassumed its normal position, while the opposite part of the fundus continued to remain outside the os, only much shortened and doubled up. As soon, however, as half of the tumour had disappeared inside the abdominal cavity, the intra-vaginal section slipped suddenly out of my fingers, and the operation was completed. The entire manœuvre was performed in a shorter time than it takes me to give its description. The entrance of the last portion of the uterus was so complete, that I deemed it unnecessary to introduce a bougie into the restored uterine cavity, with a view of preventing re-inversion.

"After the patient had recovered her senses, she felt very weak and nauseated, in which condition she continued for the next twenty-four hours. Owing to a slight feverish reaction, she was not able to leave her bed for a full week. The operation checked the hemorrhage at once, and in its place she remarked a moderate discharge of a thin serous liquid. Three weeks after the operation, the menses reappeared, and lasted seven days, the loss of blood being considerably less severe than it had been for many years back. A year afterwards, when I saw Mrs. Reaute for the last time, the position of the uterus was unchanged; pain, hemorrhage, leucorrhœa had disappeared, and the appearance of the patient was considerably changed for the better.

Nitric Acid in Hooping Cough.—Dr. S. W. NOBLE highly extols (*Chicago Med. Journal*, May, 1862) the efficacy of nitric acid in hooping cough. He used the remedy during an epidemic of the disease in McLean County, Ill., in 1852–53, with the most satisfactory results. The method of giving the acid is as follows: He adds to a tumbler of sweetened water enough nitric acid to make it pleasantly sour, and directs his patients to *drink it freely*. He has given as much as a drachm of the acid, in the twenty-four hours, to a child six months old. He asserts that this remedy very materially shortens the duration of the disease.

Seeds of the Cucurbita Pepo, or Pumpkin, in Tænia.—Dr. G. R. PATTON, of Cincinnati records (*The Cincinnati Lancet and Observer*) June, 1862) four cases of tænia successfully treated by an emulsion of pumpkin seeds. One patient was troubled with the *Bothriocephalus latus*, the others with *tænia solium*.

Dr. P. says, that "of all the anthelmintics proposed for the extermination of tænia, the seed of the ordinary pumpkin claims our first attention. It is innocuous, inexpensive, readily procured, and by far the least disagreeable of all the vermifuge medicines. Its power to dislodge large fragments of these *entozoa* has never been questioned; but it has not succeeded, in every instance, in destroying them. This results evidently from discontinuing the remedy too soon. By maintaining the treatment from four to six days (unless the head be discovered with the fragments first passed), success would, doubtless, result in all cases.

"The administration of castor-oil during its use is not to be recommended. The emulsion itself is sufficiently laxative in large doses, if a light diet be strictly enforced. By purgation we might defeat our end, by interfering with that intimate contact of the remedy with the head of the parasite, necessary to the production of its full toxicological effect."

Staphyloma of Cornea; Iridectomy; Suppuration of Globe.—Dr. HENRY D. NOYES, Assistant Surgeon New York Eye Infirmary, relates (*American

Med. Times, May 10, 1862) the following case of this, which he justly remarks is instructive in several points, and showing what may complicate the operation.

"Mary McG., æt. 17, for many months suffering from granular conjunctivitis with pannus of the corneæ, came to the Infirmary in February. After two months' treatment, consisting of general tonics, atropine in the eyes, and tr. iodine to the forehead, the acute symptoms of keratitis passed away. Photophobia, lachrymation, pain, congestion of the sclerotic disappeared, while the opacity of the cornea began to clear up. No nitrate of silver was employed, the corneal inflammation utterly forbidding, in my opinion, the employment of it or of any irritant. The left cornea was in a state of total staphyloma, the elevation not very large but deeply opaque, a ring of clearer substance remained at the extreme edge of the cornea.

"For the sake of reducing the staphyloma, as well as to take advantage of the clear margin of cornea, I determined upon iridectomy. The section was made at the lowermost part of the globe, the point of the straight lance knife entering the sclera at one-eighth inch from the cornea, and pushed very obliquely through into the anterior chamber. The stimulation of ether, and the manipulation of the eye, induced extreme turgidity of the recently congested zone of vessels surrounding the cornea. Through these distended vessels the knife penetrated, and in consequence the bleeding was very free. It even required the liberal use of sponges. The anterior chamber, when I was at last able to use the forceps, and seize the iris, was full of blood. Bleeding was renewed upon cutting off the bit of iris, and continued some minutes. The eyelids were therefore left unstrapped. Severe inflammation followed, which in spite of leeches, and paracentesis, etc. etc., culminated in rupture of the cornea by suppuration of the globe. During the week while this process was going on, two smart hemorrhages occurred from the interior of the eye."

Polypus of the Ear successfully destroyed by the Persulphate of Iron.—Dr. E. L. Holmes reports (*Chicago Medical Journal*, May, 1862) two cases of polypus of the ear successfully destroyed by the persulphate of iron, which he used in the following manner. He prepared small cylinders of the salt, about a quarter of an inch in length, and scarcely a line in diameter, from a thick paste of the iron and mucilage well rubbed together. Into a puncture, half an inch deep, which he made in the tumour with a narrow knife, he introduced one of these cylinders. On the next day the pain had not increased. On syringing the ear gently with warm water, and drying the passage with tufts of cotton, he found the meatus closed with a hard gray mass, which, on removal, proved to be a large portion of the polypus firmly coagulated. Another cylinder was introduced in the same way the next day with the same result. Subsequently he merely applied small quantities of the salt to the polypus, keeping it in place with a bit of cotton pressed firmly against it. This was repeated daily, the quantity of iron being decreased as the deeper portion of the polypus was reached. This was soon completely destroyed, and in a week or ten days two small lamina of bone exfoliated, and the ulcerated surface of bone healed.

Three months after the termination of the treatment, there was no sign of a return of the polypus.

After applying this salt several times to mucous membranes, and to surfaces covered with the most delicate cuticle, Dr. Holmes, with reason, we think, believes that there is little danger of injury to the adjacent tissues—either in polypus of the ear, nose, or of the uterus—if the application is made with care.

JEFFERSON MEDICAL COLLEGE—1862-63.

The Session will commence on Monday, the 13th of October, with a General Introductory Lecture by one of the Professors. The regular lectures will begin the day after. The Session will terminate on the last day of February.

ROBERT M. HUSTON, M. D., Emeritus Professor of Materia Medica and General Therapeutics.

CHARLES D. MEIGS, M. D., Emeritus Professor of Obstetrics and Diseases of Women and Children.

Institutes of Medicine,	By Prof. ROBLEY DUNGLISON, M. D.
General, Descriptive and Surgical Anatomy,	" JOSEPH PANCOAST, M. D.
Chemistry,	" FRANKLIN BACHE, M. D.
Institutes and Practice of Surgery,	" SAMUEL D. GROSS, M. D.
Materia Medica and General Therapeutics,	" THOMAS D. MITCHELL, M.D.
Practice of Medicine,	" S. HENRY DICKSON, M. D.
Obstetrics and Diseases of Women and Children,	" —— ——

Demonstrator of Anatomy, . . ELLERSLIE WALLACE, M. D.

Clinics will be held regularly during September; and every Wednesday and Saturday in October, and during the course, Medical and Surgical cases will be investigated, prescribed for, and lectured on before the Class. During the year ending March the first, 1862, a vast number of medical and surgical cases were treated, and several hundred surgical operations were performed; among them many of the most important.

The lectures are so arranged as to permit the student to attend the clinics of the Pennsylvania Hospital, and the Philadelphia Hospital.

On and after the 1st of October, the dissecting-rooms will be open, under the direction of the Professor of Anatomy and the Demonstrator.

FEES.

Matriculation, which is paid only once,	$ 5
To each Member of the Faculty $15,	105
Graduation,	30

ROBLEY DUNGLISON, M. D.,
Dean of the Faculty.

BELLEVUE HOSPITAL MEDICAL COLLEGE—CITY OF NEW YORK.

SECOND ANNUAL SESSION.

THE Trustees and Faculty of this College announce with much gratification the extraordinary success of the first session of instruction. The experience of that session has fully confirmed the views and expectations which led to the establishment of the College. The advantages of the plan of combining thorough didactic with demonstrative teaching, by the union of a Medical College with the Bellevue Hospital, have been practically exemplified; and the Trustees and Faculty appeal with confidence to the members of the medical class, embracing many practitioners, in behalf of the successful practical working of the new plan of medical teaching, inaugurated on an extensive scale, by this College.

FACULTY.

ISAAC E. TAYLOR, M. D., *President.*
AUSTIN FLINT, JR., M. D., *Secretary.*

JAMES R. WOOD, M. D., Professor of Operative Surgery and Surgical Pathology—No. 2 Irving Place.

FRANK H. HAMILTON, M. D., Professor of Military Surgery, Fractures, and Dislocations.

LEWIS A. SAYRE, M. D., Professor of Orthopedic Surgery—No. 795 Broadway.

ALEXANDER B. MOTT, M. D., Professor of Surgical Anatomy—No. 209 Tenth Street.

BELLEVUE HOSPITAL MEDICAL COLLEGE—Continued.

STEPHEN SMITH, M. D., Professor of the Principles of Surgery—No. 45 West Thirty-Fourth Street.

ISAAC E. TAYLOR, M. D.,	Professors of Obstetrics and the Diseases of Women and Children.	No. 13 West Twentieth St.
GEORGE T. ELLIOT, M. D.,		No. 18 West Twenty-Ninth St.
B. FORDYCE BARKER, M. D,		No. 70 Union Place.

BENJAMIN W. MCCREADY, M. D., Professor of Materia Medica and Therapeutics—No. 7 West Ninth Street.

TIMOTHY CHILDS, M. D., Professor of Descriptive Anatomy—Everett House.

AUSTIN FLINT, M. D., Professor of the Principles and Practice of Medicine—No. 74 Union Place.

R. OGDEN DOREMUS, M. D., Professor of Chemistry and Toxicology—No. 70 Union Place.

AUSTIN FLINT, Jr., M. D., Professor of Physiology and Microscopical Anatomy—No. 74 Union Place.

CHARLES PHELPS, M. D., Demonstrator of Anatomy, and Curator of the Hospital Museum.

N. R. MOSELEY, M. D., Prosector to Chair of Surgical Anatomy.

SYLVESTER TEATS, M. D., Prosector to Chair of Operative Surgery and Surgical Pathology.

A. W. WILKINSON, M. D., Assistant to Chair of Chemistry and Toxicology.

ARTHUR A. SHIVERICK, M. D., Assistant to Chair of Principles and Practice of Medicine.

PRELIMINARY TERM.

The preliminary term will commence on Wednesday, September 17, 1862, and continue to the beginning of the regular term, viz., four weeks. In addition to daily instruction in the Bellevue and Blackwell's Island Hospitals, at least three lectures will be given daily during this term, exclusively by members of the Faculty. The didactic instruction during this term will embrace the following subjects: Surgical Affections of the Breast and Testes, by Prof Wood; Surgical Affections of the Eye, by Prof. Sayre; Amputations, by Prof. Mott; Surgical Dressings, by Prof Smith; Inflammation of the Uterus, by Prof Taylor; The Symptoms, Signs, and Disorders of Pregnancy, by Prof. Barker; Uterine Therapeutics, by Prof Elliot; Diet, by Prof. McCready; Comparative Anatomy, by Prof. Childs; Diagnosis of Diseases of the Heart, by Prof. Flint; Toxicology, by Prof. Doremus; Anatomy and Functions of Glandular Organs, by Prof. Flint, Jr.

REGULAR TERM.

The regular term will commence on Wednesday October 15, 1862, and end early in March, 1863.

During the whole of the Session the student will have the opportunity of attending at least two hospital clinical lectures daily. In addition to these, four didactic lectures are given on every week day except Saturday. The didactic lectures are so arranged as not to interfere with attendance in the Hospital wards. Ample time is allowed for accompanying the visiting physicians, surgeons, and obstetricians in their daily rounds, attending clinical lectures, witnessing surgical and obstetrical operations, and following private courses, without compromising in any degree the regular didactic instruction Clinical and Demonstrative teaching constituting the great feature of this College, the arrangements are such as to render the immense resources of the Hospitals available to the student to the fullest extent.

All the lectures in this College are given either in the Hospitals or in the College building situated within the Hospital grounds.

The *Bellevue Hospital* receives annually from *ten* to *twelve thousand* patients, the average number of cases under treatment during the winter being from *eight* to *ten hundred.* Cases of all descriptions, excepting only the contagious eruptive fevers, are received. The annual number of births in the Hospital is about *five hundred.* The *Blackwell's Island Hospital*, under the charge of the Medical Board of Bellevue Hospital, contains usually about *one thousand* patients, a large proportion being affected with chronic diseases. This Hospital contains always several hundred cases of syphilis.

In addition to the immense field of clinical instruction afforded by these Hospitals, the student may avail himself of other resources for practical instruction contained in the great metropolis.

PLATE II.

Fig. 1.

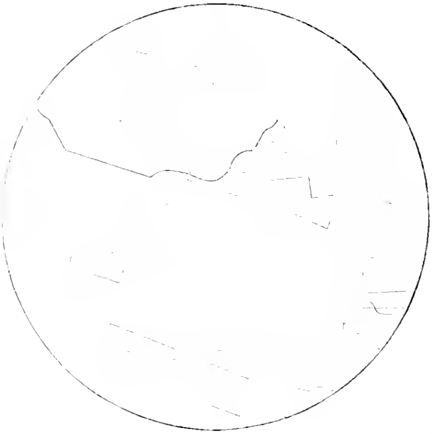


Fig. 2.

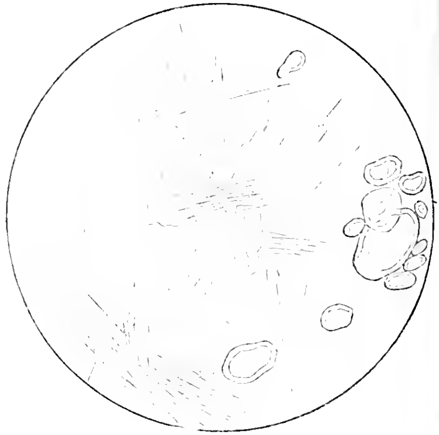
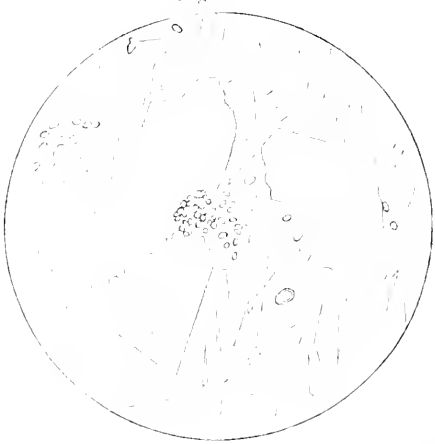


Fig. 3.



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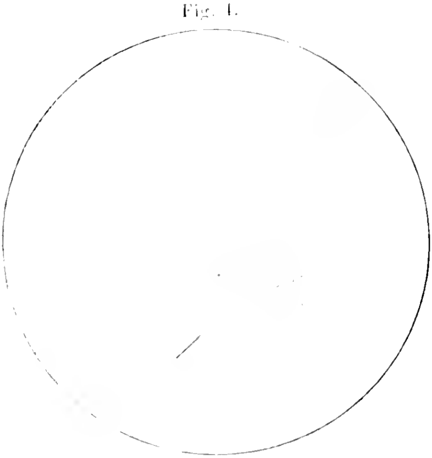

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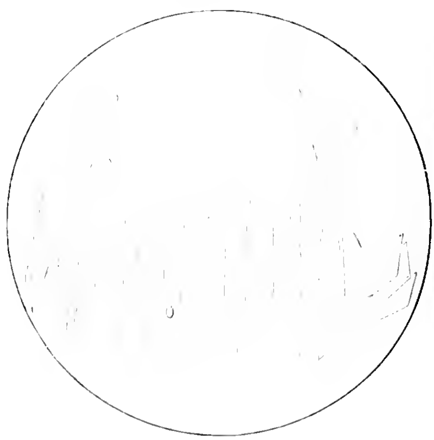
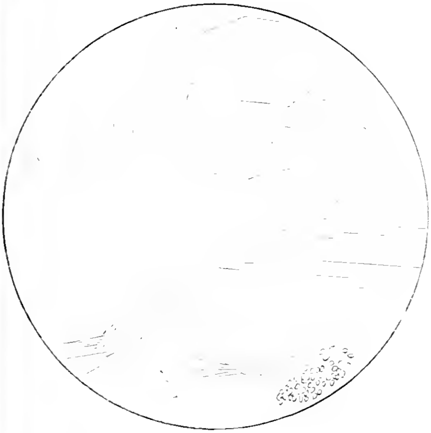


PLATE III.

Fig. 6.



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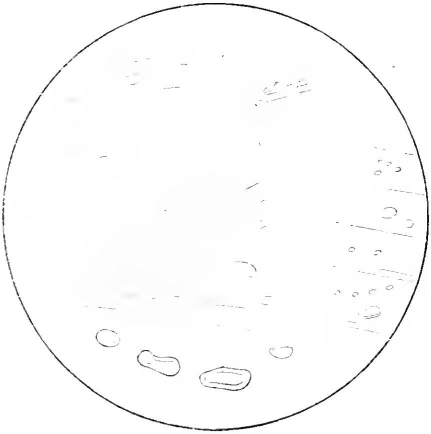

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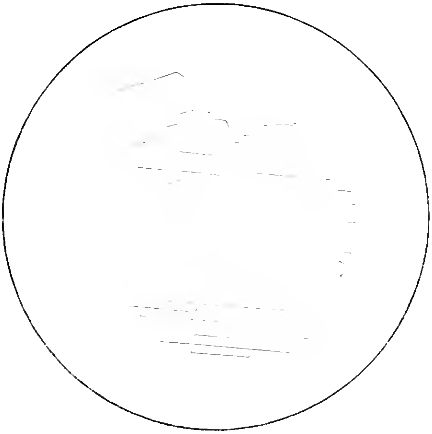


Fig. 9.

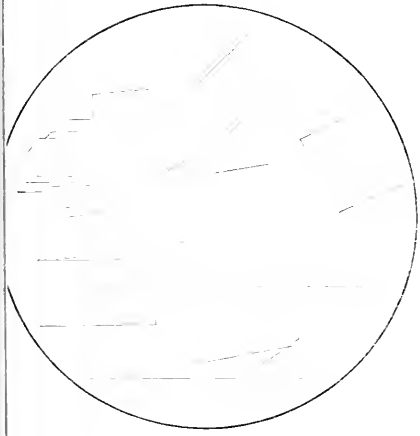


Fig. 10.

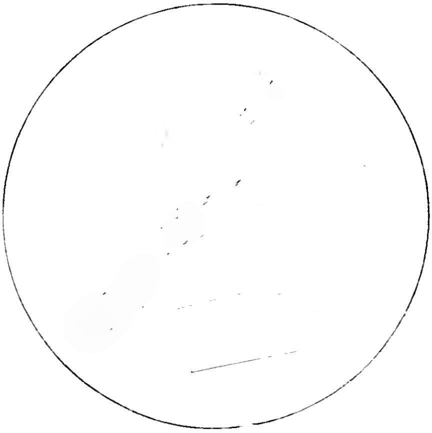


PLATE IV.

Fig. 11.

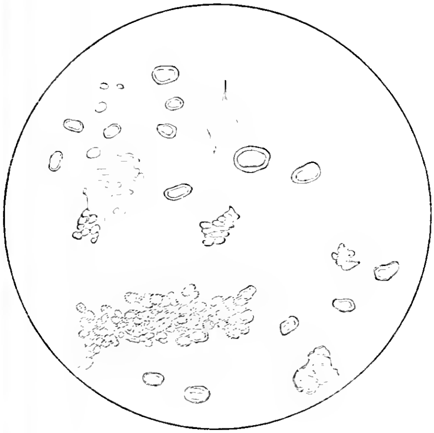


Fig. 12.

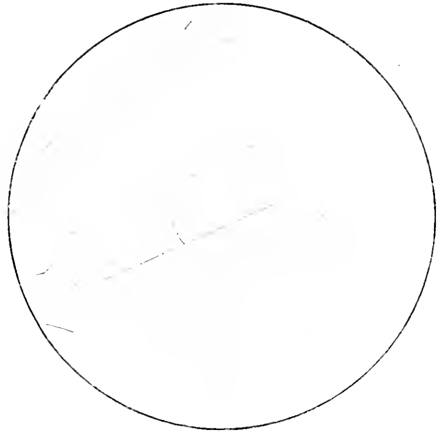


Fig. 13.

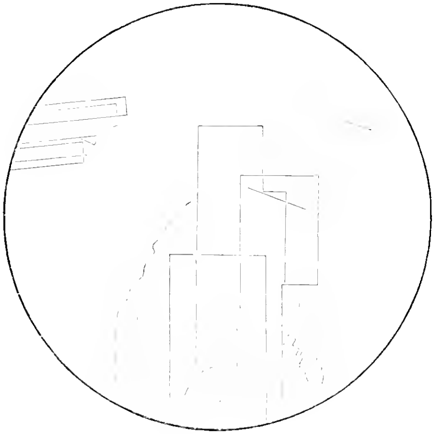
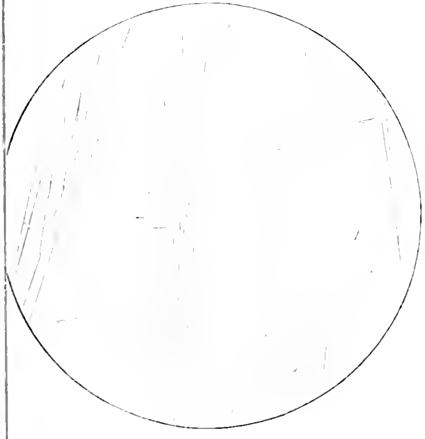


Fig. 14.



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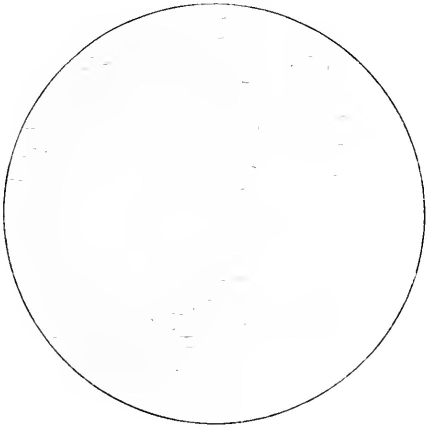


THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR OCTOBER 1862.

ART. I.—*Experimental Researches into a new Excretory Function of the Liver; consisting in the Removal of Cholesterine from the Blood, and its Discharge from the Body in the form of Stercorine.* (The Seroline of Boudet.) By AUSTIN FLINT, JR., M.D., Professor of Physiology and Microscopy in the Bellevue Hospital Medical College, New York; Microscopist to Bellevue Hospital. (Illustrated by three plates containing fifteen figures.)

"*La Cholesterine du sang est elle un de ces produits destinés à être expulsés de l'économie, et, par conséquent, dépourvus d'action immédiate sur l'économie elle même? Sa destination est tout à fait inconnue.*" Traité de Physiologie, par F. A. Longet. Paris, 1861. Tome i. p. 488.

THIS sentence, which is taken from the most elaborate treatise on physiology in any language, published at the centre of physiological science, in 1861, expresses the state of our knowledge with regard to the function of cholesterine. Cholesterine was discovered in 1782, by Poulletier de la Salle, in biliary calculi, and was detected upwards of thirty years ago in the blood by Denis; but since then, with the exception of researches of a purely chemical nature into its properties, our knowledge with regard to it has not advanced. Its chemical history even, is far from perfect; while its physiological history is unknown. In 1833 Boudet discovered a substance in the blood which he called Seroline; a principle having many characters in common with cholesterine, but heretofore interesting merely as a curious proximate principle, found in excessively minute quantities in the serum of the blood only (whence its name); too minute, indeed, for ultimate analysis. Its function was as obscure as that of cholesterine. In examining the literature of these two substances, we find that cholesterine is frequently not treated of in systematic works on physiology. Seroline is sel-

dom even mentioned. Their function has been so obscure and apparently so unimportant, that theories with regard to it have not been advanced, and the highest chemical authorities, in speaking of their office in the economy, simply say of one, as of the other, that it is unknown. In the *Chimie Anatomique*, by Robin and Verdeil, we find cholesterine summed up in these words:—

"*Le rôle physiologique qu'elle remplit dans l'économie est également inconnu.*"

Of seroline, the same authors say:—

"*On ne sait pas comment se forme la séroline, ni quel est son rôle physiologique.*"

Though the physiology of these substances is thus obscure, though chemistry has thus far done but little for their history, and physiology nothing, certain facts with relation to them would seem to indicate that they are not unimportant in the economy. Cholesterine is found in the blood, bile, liver, nervous matter, crystalline lens, meconium (not in the feces, as incorrectly stated by authors), besides in a number of morbid products. It is found in these situations *constantly;* it appears in the blood as soon as that fluid is found, and continues to the end of life. Its quantity in the blood is increased in certain diseased conditions, and diminished in others. Seroline has been said to exist constantly in the blood, though, till now, it has never been discovered in any other situation. It, like cholesterine, is a constant principle, they having many chemical characters in common. Their function is definite; it is important; and, if the writer do not exaggerate this importance in the enthusiasm of exploring a hitherto absolutely uncultivated field, a knowledge of the functions of these substances will be of incalculable value to the practical physician; and the path thus opened by physiology will lead to a great field for pathological inquiry. *What the discovery of the function of urea has done for diseases which now come under the head of uremia, the discovery of the function of Cholesterine may do for the obscure diseases which may hereafter be classed under the head of Cholesteremia.*

It is not surprising that the function of substances—which have been isolated with great difficulty, *which have never been found in any of the excretions*, which exist in quantity so small, that their investigation seemed to belong especially to the chemist, physiologists having been discouraged, perhaps, from studying them—should be thus obscure. But it is surprising that that important fluid, the bile, the product of the largest gland in the economy, and the one most constantly found in the animal scale, should be so little understood. This has been regarded by some as a simple excrement, and by others as not an excrementitious, but a digestive fluid, and so much labour has been expended by physiologists in endeavours to settle this point, that no one has pretended to give an account of its excre-

mentitious function, if it have any, and researches into its digestive function have left us almost entirely in the dark. Blondlot reported an observation on a dog which lived for five years with a biliary fistula diverting, as it is stated, all the bile from the intestines and discharging it from the body. The animal presented no untoward symptoms, died a natural death, no bile found its way into the intestines, but it was all discharged. According to this observation, the bile would appear to be purely an excrement. Schwann, and Bidder and Schmidt, in a large number of experiments, never succeeded in keeping a dog operated on in this way for more than a few weeks; they all died with evidences of inanition. The bile, according to these observations, is concerned chiefly in nutrition; and as it is poured into the upper part of the digestive tube, it is important, probably, in digestion. But Bidder and Schmidt do not satisfy us what its digestive function is; nor does Blondlot say what principle is excreted by it, nor what would be the result of its suppression.

Aside from a few isolated facts, interesting enough, but indicating nothing definite, this is all we know of the function of the bile. But what physiologist does not feel this hiatus in his science; or what practical physician does not feel and know the importance of the function of the bile! It needs no inquiry into natural history, showing the universality, almost, of the liver in the animal scale, to impress upon the physician at the bedside the importance of the bile. A patient is suffering under an obscure ailment, which he may call biliousness or derangement of the liver, and which, in some unexplained way, is relieved by a mercurial purge. The practitioner knows that the bile-secreting function of the liver is important, but does not learn it from the physiologist. Every practitioner must feel that the liver has a function which must be explained him by the physiologist, before he can avoid treating a large class of diseases empirically.

The bile has an important excretory function, which is liable to many disorders; and this function the writer hopes to be able, in the present article, to describe.

It will be seen by the preceding remarks that the physiological history of the bile remains to be written. The subject is too interesting and important not to engage the mind of the experimental physiologist. It is difficult at first sight to harmonize statements, to which reference has just been made, of experimenters, equally entitled to consideration, which are diametrically opposed. But of course the philosophical method of studying the bile is first to settle whether it be excrementitious or recrementitious. If the former, what substance is excreted, and where is it formed? If the latter, what function does it perform in any of the processes of nutrition. With the view to harmonize, if possible, in my own mind, the opposite statements of Bidder and Schmidt, and Blondlot, I attempted some time ago to establish biliary fistulæ in dogs. The first experiments were made in New Orleans in the winter of 1860–61; but were all of them unsuc-

cessful, no animal surviving the operation more than three days. The experiments were discontinued at that time, but were renewed in the winter of 1861–62 at the Bellevue Hospital Medical College. After a number of trials which were no more successful than those made the previous winter, I succeeded in performing the operation with considerable rapidity and with very little disturbance of the abdominal organs, and in one animal the success was complete.

Exp. 1. The operation was performed by making an incision into the abdomen in the median line just below the ensiform cartilage, about three inches in length. The edge of the liver was carefully raised, the bile duct isolated, and two ligatures applied, one next the duodenum and the other near the junction of the ductus choledochus with the cystic duct, the intermediate portion being excised. The fundus of the gall-bladder was then drawn to the upper part of the wound, an incision made in it of about an inch in length, the bile evacuated, and the edges attached to the skin by points of the interrupted suture. The wound was then carefully closed around the opening into the gall-bladder.

This is nearly the proceeding recommended by Blondlot, who prefers, however, to operate while the animal is fasting, as the gall-bladder is then distended and can be more easily found. I have preferred to operate after feeding, when the gall-bladder is comparatively empty, as there is no great difficulty in finding it, and in evacuating its contents less bile is apt to find its way into the peritoneal cavity, which is one of the causes of the intense peritonitis which follows this operation.

The animal ate well the day after the operation, the bile flowed freely from the fistula and was entirely cut off from the intestine, as shown by post-mortem examination. No symptoms supervened except those produced by the diversion of the bile from its normal course. This operation was performed on the 15th of November, 1861, and the animal lived thirty-eight days.

In no observation that I have found recorded has the animal been so free from inflammation consequent upon so serious an operation; and this seemed a most favourable opportunity of determining whether an animal could live with the bile shut off from the intestinal tube and discharged by a fistula. In this case the animal gradually lost flesh and strength, his appetite becoming voracious, until finally he died of inanition; the observation agreeing in every important particular with the experiments of Schwann, and Bidder and Schmidt.

Exp. 2. This experiment was undertaken to ascertain, if possible, the entire quantity of bile secreted in the twenty-four hours. A fistula was made into the ductus communis choledochus, the duct being divided and a silver tube introduced. The experiment did not succeed in the point of view in which it was undertaken, and about forty-eight hours after the operation, the tube dropped out. After the removal of the tube the bile ceased to flow externally, and the animal did not appear to suffer any bad effects from the experiment. Thirty days after the operation, the animal having entirely recovered, he was killed by section of the medulla oblongata, and the parts carefully examined. The post-mortem examination I transcribe from my note book.

"On post-mortem examination the liver was found adherent to the dia-

phragm over the greater part of its convex surface. There were evidences of limited inflammation over the duodenum. The liver itself was normal. Upon opening the duodenum, the papilla which marks the opening of the ductus communis choledochus was normal in appearance. A small silver stilet was introduced into the duct. *For a long time it was impossible to find any communication between the upper part of the duct and the intestine; but at last, after patient searching (knowing that no bile was discharged from the body and that it was absolutely certain that a communication existed with the duodenum), a communication was found.* In Blondlot's case there probably was a communication re-established which escaped his observation."

In the remarkable observation reported by Blondlot, in which the animal survived for so long a period, the success is attributed to the fact that the dog was prevented from licking the bile as it flowed from the fistula, Blondlot stating that as soon as the animal was prevented from licking the bile, nutrition began to improve. Anxious to carry out all the precautions which had been adopted, I so muzzled the animal in Exp. 1, covering the lower part of the muzzle with oiled silk, that it was impossible for him to swallow a drop of the bile. This muzzle was kept on till the death of the animal, but the proceeding had no effect on his nutrition. The bile flowed so freely from the fistula that all the lower part of the animal was covered with it. It was not, however, until I made the post-mortem examination in the second experiment that I was able to see the difficulty which I had experienced in harmonizing the observations of the different experimenters I have quoted. In the lower animals—in dogs, at least—ducts have a remarkable tendency to re-establish themselves. Any one who has operated much upon the glands can hardly fail to have noticed this fact. The pancreatic duct, for example, after having been divided and a tube introduced, becomes invariably re-established after the simple removal or dropping out of the tube. It was so with Exp. 2, in which the tube dropped out of the bile duct. The duct undoubtedly became re-established, for no bile flowed externally for nearly a month, the animal enjoying perfect health, and the fluid necessarily being emptied into the intestine; yet it was with the greatest difficulty that the communication could be found with the probe, and it was only after long searching, knowing that there must be a communication, that it was discovered at all. Taking into consideration the great difficulty I had in finding the passage in this instance, and after having carefully examined the case reported by Blondlot, I have concluded that a communication existed in his experiment which escaped observation, but by means of which a large quantity of bile found its way into the intestine.[1]

[1] An account of this experiment is to be found in an article entitled "*Essai sur les Fonctions du Foi et de ses annexes par N. Blondlot.*" 1846. The post-mortem examination of the animal, made more than five years after the establishment of the fistula, was published in a little memoir complementary to the preceding, entitled "*Inutilité de la Bile dans La Digestion.*" 1851. It was not contemplated to

With regard to the digestive function of the bile, it is sufficient to state here that the experiments which I have made on this subject have led me to believe that this fluid has an important office in connection with the function of digestion—one, indeed, which is essential to life. The nature of its office, however, is not understood, and can only be settled by a long and carefully executed series of experimental researches which would probably involve the whole subject of digestion. This I hope to be able to present in another paper. There is, however, another function of the bile entirely distinct from the preceding. It is the separation from the blood of the cholesterine, an excrementitious substance, which is formed by the destructive assimilation of certain tissues of the body. Though not discharged from the body as cholesterine, it being first changed into another substance, it is separated in that form from the blood and poured into the intestine by the ductus communis choledochus. This new excretory function of the bile will form a great part of the subject of this paper; the recrementitious function, which is necessary to complete the physiological history of this fluid, being deferred.

We will find the cholesterine to be the most important excrement separated by the liver, as the urea is the most important one separated by the kidneys; and the study of this substance will necessarily involve the depurative function of the liver. I will therefore begin with the cholesterine, and endeavour to show where it is formed in the economy, by following the blood in its passage through various organs. This will necessarily involve a description of the chemical processes which have been employed in its extraction. I will then endeavour to show where the cholesterine is removed from the blood, by the same method of investigation. The next step will be to follow it out of the body, and study the change which it undergoes in its passage through the alimentary canal. Having described the process of formation in the tissues, separation from the blood by the liver, and final discharge from the body, I will endeavour to show, finally, the effects of interruption of this function of the liver upon the economy. This will lead us into pathology, and a host of diseases will arise which may be dependent on a disturbance of the excretory function of the liver. We will be enabled to draw the line more closely between conditions in which there is resorption simply of the innocuous colouring matter of the bile, and those diseases in which there is a failure to separate the excrements from the blood. These conditions, it is well known, are widely different as to gravity, and the distinction between them is of great importance. The latter condition, characterized by the retention of cholesterine in the blood, will be treated of under the name of *Cholesteremia*.

enter into a full discussion of the views of Blondlot and others on the uses of the bile in digestion. That subject will be taken up in another paper in which the digestive properties of the bile will be mainly considered. In this connection it is proposed to take up only the excrementitious function of the bile.

Cholesterine.

Chemical characters.—Cholesterine is a non-nitrogenized substance, having all the properties of the fats, excepting that of saponification with the alkalies. Its chemical formula is usually given as $C^{25}H^{22}O$. It belongs to a class of fatty substances which are non-saponifiable, which have been grouped by Lehmann under the name of lipoids. This class is composed of cholesterine and seroline, which are animal substances; castorine, from the *castoreum*, and ambrein, from amber. To this he adds a substance discovered in a uterine tumour by Busch, called inosterine. Cholesterine is neutral, inodorous, crystallizable, insoluble in water, soluble in ether, very soluble in hot alcohol, though sparingly soluble in cold. It burns with a bright flame, but is not attacked by the alkalies, even after prolonged boiling. When treated with strong sulphuric acid, it strikes a peculiar red colour, which is mentioned by some as characteristic of cholesterine. I have found that it possesses this character in common with seroline.[1]

Forms of its crystals.—Cholesterine may easily and certainly be recognized by the form of its crystals, the characters of which can be made out by means of the microscope. They are rectangular or rhomboidal, exceedingly thin and transparent, of variable size, with distinct and generally regular borders, and frequently arranged in layers with the borders of the lower ones showing through those which are superimposed. This arrangement of the crystals takes place when the cholesterine is present in considerable quantity. In pathological specimens they generally are few in number, and isolated. The plates of cholesterine are frequently marked by a cleavage at one corner, the lines running parallel to the borders; frequently they are broken, and the line of fracture is generally undulating. Lehmann attaches a great deal of importance to measurements of the angles of the rhomboid; according to this author, the obtuse angles are 100° 30′, and the acute 79° 30′. I have lately examined a great number of specimens of cholesterine, extracted from the blood, bile, brain, liver, and occurring in tumours, and am confident that the crystals have no definite angle. Frequently the plates are rectangular, and sometimes almost lozenge-shaped. It is by the transparency of the plates, the parallelism of their borders, and their tendency to break in parallel lines, that we recognize them as formed of cholesterine. Lehmann seems to consider the tablets of this substance as regular crystals, having invariable angles. From examination during crystallization, I am disposed to think that they are not crystals, but fragments of micaceous sheets, which, from their extreme tenuity, are easily broken. In examining a specimen from the meconium, which I extracted with hot alcohol, I was able to see a transparent film forming on the surface of the

[1] This reaction of the seroline is mentioned by Bérard, in the "*Cours de Physiologie,*" tome iii. p. 117.

alcohol soon after it cooled; this, on microscopic examination, *in situ*, disturbing the fluid as little as possible, was found to be marked by long parallel lines. When the fluid had partially evaporated, it became broken and took the form of the ordinary crystals of cholesterine, but they were larger and more regular. The beauty of the tablets at this stage could not be adequately represented. They were exceedingly thin, and regularly divided into delicate plates, with the characteristic corner cleavages of the cholesterine; and, as the focus of the instrument was changed, new layers, with different arrangement, were brought into view. I have attempted to give an idea of the form of these tablets in Fig. 1; but it is, of course, impossible to represent their pale, but beautifully distinct borders. As has been remarked by Robin, the borders of these crystals can be but imperfectly imitated by a line; there is no line in the object itself, but the edge shows where the tablet ceases. (See Fig. 1.)

The crystals are generally colourless, but when present in coloured fluids, may take a yellowish tint, or even become very dark. They may still be recognized, however, by the characters of form just described.

Crystals of cholesterine melt at 293° Fahr., but are formed again when the temperature falls below that point. According to Lehmann, they may be distilled *in vacuo* at 680° without decomposition. The determination of the fusing point is one of the means of distinguishing it from seroline, which fuses at 90° 8′.

Situation of the cholesterine.—Most authors state that the cholesterine is found in the bile, blood, liver, brain and nerves, crystalline lens, meconium, and the fecal matter. I have found the cholesterine in all these situations invariably, excepting the feces, where it was seen but once after a number of examinations; and in studying the works of those who have investigated this substance, I can find no one who has found it in the normal feces. It is found in large quantities in the meconium, from which, perhaps, it is most easily extracted in a state of purity, and has been extracted from the feces of animals in a state of hibernation; but though it may occasionally be found in the feces in disease, and in animals after long fasting, I am confident that it never occurs in the ordinary conditions. The analysis of the fecal matter is so unattractive, that it has been very much neglected by chemists; and until a few years ago, when an elaborate analysis was made by Marcet, to which reference will hereafter be made, the analyses of Berzelius formed nearly all our data on this subject. Cholesterine forms the greater part of biliary calculi, which indeed consist generally of nothing but cholesterine, colouring matter, and mucus. It is found in a large number of morbid deposits. Few cases of cancer are examined without discovering tablets of cholesterine. It is very abundant in encysted tumours. According to Robin, atheromatous deposits, which are found in the middle coats of the arteries, are often composed of cholesterine. It sometimes forms distinct tumours or deposits in the substance of the brain.

I lately had an opportunity of examining a tumour from the brain, at the Bellevue Hospital, which consisted of nearly pure cholesterine. It has often been found in the fluid of hydrocele, in the fluid of ovarian cysts, in crude tubercle, in epithelial tumours, and in pus. The proportion in which it exists in the fluids of the body is very small. I have made a number of quantitative analyses of the blood, the results of which I give in the following table, with some of the analyses which have been made for this substance. I also give the quantity which I have found in the other situations in which it is found. The variations in different parts of the circulation and in diseased conditions will be given in another table. The quantity in the brain and crystalline lens has, I believe, never before been estimated:—

Table of Quantity of Cholesterine in various Situations.

Situation.	Observer.	Quantity examined.	Cholesterine per 1,000 pts.
Venous blood (male)	Becquerel and Rodier.		0.090
Do. (female)	Becquerel and Rodier.	*grains.*	0.090
Do. (male æt. 35)	A. Flint, Jr.	312.083	0.445
Do. (male æt. 22)	A. Flint, Jr.	187.843	0.658
Do. (male æt. 24)	A. Flint, Jr.	102.680	0.751
Bile (human)	Frerichs.		1.600
Do. (normal of ox)	Berzelius.		1.000
Do. (human)	A. Flint, Jr.	224.588	0.618
Meconium.	Simon.		160.000
Do.	A. Flint, Jr.	170.541	6.245
Brain (human)	A. Flint, Jr.	159.753	7.729
Do. do.	A. Flint, Jr.	150.881	11.456
Crystalline lens (ox)[1]	A. Flint, Jr.	135.020	0.907

Form under which the cholesterine exists in the organism.—In the fluids of the body cholesterine exists in a state of solution, but by virtue of what constituents it is held in solution, is not entirely settled. It is stated that the biliary salts have the power of holding it in solution in the bile, and that the small amount of fatty acids which are contained in the blood hold it in solution in that fluid, but direct experiments on this point are wanting. In the nervous substance and in the crystalline lens it is united "*molecule à molecule*" to the other elements which go to make up these tissues. After it is discharged into the intestinal canal, when it is not changed into stercorine, it is to be found in a crystalline form, as in the meconium, and in the feces of animals in a state of hibernation. In pathological fluids and in tumours, it is found in a crystalline form, and may be detected by microscopic examination.

Process for the extraction of cholesterine.—Without describing the processes which have been employed by other observers for the extraction of cholesterine from the blood, bile, and various tissues of the body, I will confine myself to a description of the process which I have found most

[1] In this examination four fresh crystalline lenses of the ox were used.

convenient to employ in the analyses I have made for this substance. In analyses of gall-stones the process is very simple; all that is necessary being to pulverize the mass, and extract it with boiling alcohol; filter the solution while hot, the cholesterine being deposited on cooling. If the crystals be coloured, they may be redissolved, and filtered through animal charcoal. This is the proceeding employed by Poulletier de la Salle, Fourcroy, and Chevreul. It is only when this substance is mixed with fatty matters, that its isolation is a matter of any difficulty. In extracting cholesterine from the blood, I have operated on both the serum and clot, and in this way have been able to demonstrate it in greater quantities in this fluid than has been observed by others, who have employed only the serum. The following is the process for quantitative analysis, which I determined upon after a number of experiments.

The blood, bile, or brain, as the case may be, is first carefully weighed, then evaporated to dryness over a water-bath, and carefully pulverized in an agate mortar, so as to collect every particle. The powder is then treated with ether, in the proportion of about a fluidounce for every hundred grains of the original weight, for from twelve to twenty-four hours, agitating the mixture occasionally. The ether is then separated by filtration, throwing a little fresh ether on the filter so as to wash through every trace of the fat, and the solution set aside to evaporate.[1] If the fluid, especially the blood, have been carefully dried and pulverized, when the ether is added it divides it into a very fine powder, and penetrates every part. After the ether has evaporated, the residue is extracted with boiling alcohol in the proportion of about a fluidrachm for every hundred grains of the original weight of the specimen, filtered, while hot, into a watch-glass, and allowed to evaporate spontaneously. To keep the fluid hot while filtering, the whole apparatus may be placed in the chamber of a large water-bath, or, as the filtration is generally rapid, the funnel may be warmed by plunging it into hot water, or steaming it, taking care that it be carefully wiped. We now have the cholesterine mixed with a certain quantity of saponifiable fat. After the fluid has evaporated, we can see the cholesterine crystallized in the watch-glass, mingled with masses of fat. This we remove by saponification with an alkali; and for this purpose, we add a moderately strong solution of caustic potash, which we allow to remain in contact with the residue for from one to two hours. If much fat be present, it is best to subject the mixture to a temperature a little below the boiling point; but in analyses of the blood, this is not necessary. The mixture is then to be largely diluted with distilled water, thrown upon a small filter, and thoroughly washed till the solution which passes through is neutral. We then dry the filter, and fill it up with ether, which, in pass-

[1] The ether may be preserved by distillation, instead of allowing it to evaporate, but with the small quantity usually employed this is hardly worth while.

ing through, dissolves out the cholesterine. The ether is then evaporated, the residue extracted with boiling alcohol, as before, the alcohol collected on a watch-glass, previously weighed, and allowed to evaporate. The residue consists of pure cholesterine, the quantity of which may be estimated by weight.

The accuracy of this process may be tested by means of the microscope. As the crystals have so distinctive a form under the microscope, it is easy to determine by examining the watch-glass, whether it has been obtained in a state of purity. In making this analysis quantitatively, it is necessary to be very careful in all the manipulations; and for determining the weight of such minute quantities, an accurate and delicate balance, one, at least, that will turn with the thousandth of a gramme, carefully adjusted, must be employed. With these precautions, the quantity of cholesterine in any fluid or solid may be determined with perfect accuracy. The quantity of cholesterine may be estimated in from fifteen to twenty grains of blood. In analyzing the brain and bile, I found it necessary to pass the first ethereal solution through animal charcoal, to get rid of the colouring matter. In doing this, the charcoal must be washed with fresh ether till the solution which passes through is brought up to the original quantity. The other manipulations are the same as in examinations of the blood. In examining the meconium, I found that the cholesterine which crystallized from the first alcoholic extract was so pure that it was not necessary to subject it to the action of an alkali.

I am aware that in describing the process for the extraction of cholesterine I have entered into details which would be superfluous for the practical chemist. But the extraction of this substance from the blood is so simple, and the results of the examination of blood in different parts of the circulatory system have been so striking and important, that I cannot but indulge the hope that the observations which follow will be verified by those who may not be skilful practical chemists. Almost any one is competent to make a quantitative analysis of the blood for cholesterine. It simply requires six days for the process, and a number of analyses may be carried on at the same time. It requires one day, after the blood has been dried and pulverized, for the ether to act upon it; the next morning it is filtered and set aside; the next morning it will be dry, and may be extracted with alcohol, and set aside to evaporate; the next morning it may be treated with potash, filtered, and the filter washed with water; the following day it may be washed with ether, and set aside to evaporate; the following day it will have evaporated, and may be extracted with hot alcohol; and the following day the alcohol will have evaporated, and the specimen may be examined by the microscope and weighed. All that is required is a little care in the performance of these simple manipulations—which one with a slight acquaintance with operations in chemistry may perform at once, and

one or two trials will enable a novice to execute—and accuracy in weighing, which is, indeed, the most delicate part of the process.

History of cholesterine.—A brief sketch of the history of this substance may not be uninteresting. It was first obtained by Poulletier de la Salle, in 1782, who extracted it from a biliary calculus. He communicated his observations to Fourcroy, who published them, after having verified his experiments, the death of the discoverer preventing him from making his observations public. Afterwards, in examining an old, hardened, liver, Fourcroy found a concrete, oily substance, analogous to that discovered by Poulletier. He imagined that the liver had become changed into a substance resembling spermaceti. The cholesterine was afterwards found in gall-stones, by Vicq d'Azyr, by Jaquin, Titius and Kreysig. In 1791 Fourcroy described a substance which he called adipocire, found in bodies at the *cimetière des Innocents*, which he likened to spermaceti and to cholesterine. He always, however, made a distinction between these substances; calling the cholesterine *crystallizable adipocire.* In 1814 Chevreul established the difference between the adipocire and the cholesterine, giving a full description of the cholesterine. He extracted it from the bile of the human subject, of the bear, and of the pig.

After that time a number of chemists found it in the gall-stones and intestinal concretions. Lassaigne found it in a cerebral tumour, Guérard in hydatid cysts of the liver, Morin in the liquid from an abdominal tumour, Caventou in the matter from an abscess under the malar bone, and a number of others in tumours in various situations. In 1830 it was discovered in the blood by Denis, and afterwards described by Boudet, who wrote an elaborate article on the composition of the serum of the blood in 1833, in which he describes the cholesterine and a new substance which he called *seroline.*[1] It was also detected in normal blood by Lecanu and Marchand. Couerbe, who made elaborate researches into the chemical composition of the cerebral substance, pointed out the existence of cholesterine in the brain. Lebert found it in the substance of cancerous tumours, Curling found it in the fluid of hydrocele, Simon extracted it from the meconium, and Preuss discovered it in the substance of crude tubercle. Of late authors, Becquerel and Rodier have been most extended in their investigation of this principle.[2] They have made a number of careful quantitative analyses of the blood for this substance in health and disease. Their observations will be more particularly referred to further on.[3]

[1] Boudet, Nouvelles Recherches sur la composition du serum du sang humain. Annales de Chimie et de Physique, tom. lii. p. 337.

[2] Traité de Chimie Patho'ogique appliquée à la médecin pratique, par M. Alf. Becquerel, Professeur agrégé, etc., et par M. A. Rodier, Docteur en Médecine, etc. Paris, 1854, and Recherches sur la composition du sang. Paris, 1844.

[3] The history of the cholesterine was mostly compiled from the excellent work of Robin and Verdeil, the Chimie Anatomique.

Functions of the cholesterine.—By experiments which I have performed upon the lower animals, and by certain facts which have been developed by observations on the human blood in health and disease, I conceive that I have been enabled to solve the problem of the function of cholesterine.

Cholesterine is an excrementitious product, formed in great part by the destructive assimilation of the brain and nerves, separated from the blood by the liver, poured into the upper part of the small intestine with the bile, transformed in its passage down the alimentary canal into stercorine (the seroline of Boudet, a substance differing very little from cholesterine), *and, as stercorine, discharged by the rectum.*

The quotation with which I prefaced this paper expresses the actual state of the science with regard to cholesterine. Still, though our actual knowledge of its function has been so slight, a few writers on chemical physiology and on physiology, taking the limited data on this subject, make reference to it as an effete substance. With regard to its relation to the brain, some think that it is formed in the brain and taken up by the blood, while others think that it is formed in the blood and deposited in the brain. All the views with regard to its effete properties are, of course, based on the supposition that it is discharged in the feces. Effete matters are discharged from the body, and this would find its exit by the anus, since it has never been detected in the urine. These conjectures have attracted little attention in the scientific world; and these views being based on the supposition that this substance is formed in the fecal matters, fall to the ground from the fact that no one as yet detected it in the feces. The fact that cholesterine is so generally considered an ingredient of the feces may be thus explained. It is poured into the alimentary canal with the bile; no one has shown what becomes of it, the chemistry of the feces being little understood, and therefore it has been assumed that it is found in the feces. That the facts which we have with regard to cholesterine render its effete properties possible, and, perhaps, probable, is certainly true; but these facts are merely sufficient to enable the scientific investigator to address an intelligent inquiry to nature on this subject; they do not resolve the question. In the experiments which form the basis of this article, the inquiry was made and the answer obtained; some others have, without much reflection, apparently, made simple statements which approximate in some degree to the facts. The only way these assertions could be sustained is by the labour which I have expended in eliciting from nature a reply to my interrogatories.

The works which I have had an opportunity of consulting where any decided opinion relative to the function of cholesterine has been expressed, are those of Carpenter, Lehmann, Mialhe, and Dalton.[1]

[1] These authors are quoted in the order in which their publications appeared.

Carpenter, in the fifth American edition of his Human Physiology, 1853, has the following with regard to the function of cholesterine.

"It is also stated to be a constituent of the nervous tissue, having been extracted from the brain by Couerbe, and other experimenters; but it may be doubted whether this is not rather a product of the disintegration of nerve-substance, which is destined to be taken back into the blood for elimination by the excretory apparatus, like the kreatine which may be extracted from the juice of flesh, or the urea which is obtainable from the vitreous humour of the eye, both being undoubtedly excrementitious matters. For cholesterine is a characteristic component of the biliary excretion, and is closely related to its peculiar acids; so that it can scarcely be looked upon in any other light than as an excrementitious product, the highest function of which is to assist in the support of the calorifying process. It is frequently separated from the blood as a morbid product; thus it is often present in considerable quantity in dropsical fluids, and particularly in the contents of cysts; and it may be deposited in the solid form in degenerated structures, tubercular concretions, &c."[1]

In Lehmann, we find the following on this subject :—

"Judging from the mode of its occurrence, we must regard it as a product of decomposition; but from what substances and by what processes it is formed, it is impossible even to guess. Notwithstanding the similarity which many of its physical properties present to those of the fats, we can hardly suppose that it takes its origin from them, since the fats, for the most part, become oxidized in the animal body, whereas in order to form cholesterine, they must undergo a process of deoxidation."[2]

I translate the following from the excellent work of Mialhe, on Chemistry applied to Physiology and Therapeutics, Paris, 1856, the paragraph entitled "Source of Cholesterine in the Animal Economy."

"We have just examined in what manner the fatty bodies penetrate into the blood. Some eminent *savans* have held that the fatty matters from the exterior are the only ones which exist in the economy, and that it is incapable of producing these in itself. Now it is an opposite opinion which tends to predominate, and the majority of physiologists think that certain fatty bodies take origin in the very substance of our organism. This last mode of origin seems at least incontestable for the cholesterine, which has not yet been found in the vegetable kingdom.

"But what are the chemico-physiological reactions which preside over the development of this particular fatty substance?

"There are for us two modes for comprehending the formation of the cholesterine at the expense of the elements of the blood. Cholesterine may come from the fatty matters; it would be, in this case, like the final result or last stage of chemical modifications which the fatty matters undergo in the animal economy.

"This manner of viewing it is slightly probable; for, in order that it should be true, it would be necessary that the fatty bodies, in oxidizing, should give rise to a compound richer than they in carbon. We know, indeed, that cholesterine is, of all fatty bodies, the one which contains the most carbon.

"We think that we should reject that opinion and stop at the following.

"The production of cholesterine may be attributed to a transformation of the albuminoid materials, a transformation analogous to that which has been pointed out by M. Blondeau de Carrolles in cheese, and which that chemist has designated under the name of adipose fermentation. The large proportion of carbon which the cholesterine contains, and which approximates it to albuminous matters, would come to the support of that point of view. The retardation of the

[1] Carpenter's Principles of Human Physiology, page 74. Philadelphia, 1853.

[2] Physiological Chemistry, by Professor C. G. Lehmann, vol. i. 248. Philadelphia, 1855.

circulation, and the deficiency of oxidation which is the consequence of it, explains also why the cholesterine is in much greater proportion in the closed cavities than in the blood itself.

"Whichever it may be of these two opinions, it is incontestable for us that, if the cholesterine be not burned with the other matters proper to respiratory alimentation, it is solely on account of its chemical inertia; cholesterine, indeed, is to fatty matters what mannite is to saccharine substances—what urea is to albuminoid matters; that is to say, that it constitutes a kind of *caput mortuum*, of which the organism has only to free itself. It is certain also, for us, that if the cholesterine is not found in all the excrementitious liquids, where most of the other products existing in the blood are found, it is solely on account of its insolubility.

"The preceding remarks explain perfectly, to our eyes at least, why the presence of cholesterine has never been established in the urine of man, either in the form of crystals, or 'calculi,' while this substance is found in the bile, where it very often forms calculi of considerable size. Cholesterine, indeed, is insoluble in acid liquids, such as the urine; while it is soluble in soapy liquids, such as the bile. Such is solely the reason why the cholesterine is excreted by the biliary passages."[1]

Finally, in Dalton's *Treatise on Human Physiology*, we find the following paragraph in which the subject of cholesterine is considered :—

"CHOLESTERINE ($C_{25}H_{22}O$).—This is a crystallizable substance which resembles the fats in many respects, since it is destitute of nitrogen, readily inflammable, soluble in alcohol and ether, and entirely insoluble in water. It is not saponifiable, however, by contact with the alkalies, and is distinguished on this account from the ordinary fatty substances. It occurs, in a crystalline form, mixed with colouring matter, as an abundant ingredient in most biliary calculi, and is found also in different regions of the body, forming a part of various morbid deposits. We have met with it in the fluid of hydrocele, and in the interior of many encysted tumours. The crystals of cholesterine have the form of very thin, colourless, transparent, rhomboidal plates, portions of which are often cut out by lines of cleavage parallel to the sides of the crystal. They frequently occur deposited in layers, in which the outlines of the subjacent crystals show very distinctly through the substance of those which are placed above. Cholesterine is not formed in the liver, but originates in the substance of the brain and nervous tissue, from which it may be extracted in large quantity by the action of alcohol. From these tissues it is absorbed by the blood, then conveyed to the liver, and discharged with the bile."[2]

The above extracts embrace all that I have been able to find bearing on the question of the function of cholesterine. The extracts from Mialhe and Dalton contain all that is said by them on this subject. Those from Carpenter and Lehmann contain only what bears on the function of this substance, the chemical details being omitted. Of the authors cited, Mialhe is the most extended on the subject, and is almost the only one who adduces any arguments to support his views; but his opinions are biased by the purely chemical view which he takes of the subject, and are involved with the ideas with reference to plastic and calorific food, now rejected by many

[1] Chimie appliquée à la Physiologie et à la Thérapeutique. Par M. le Docteur Mialhe. Page 191. Paris, 1856.

[2] A Treatise on Human Physiology, designed for the use of Students and Practitioners of Medicine. By John C. Dalton, Jr., M. D., Professor of Physiology and Microscopic Anatomy in the College of Physicians and Surgeons, New York, &c. Page 189. Philadelphia, 1861.

eminent physiologists, and which, I conceive, will be so little supported by future advances in science, that they will soon be universally discarded, in the exclusive sense in which they are received by him. Putting these hypotheses aside, we examine the actual state of our science, with regard to cholesterine, and we find that the function, up to this time, has not been established. We will now proceed to the facts which tend to support the statement I have made on this point.

Cholesterine exists in the blood, from which it may be extracted in a state of purity, and estimated by the process which I have already indicated. Becquerel and Rodier have made analyses of the healthy human blood for this substance with the following results:—

Venous blood of the male				0.09 pts. per 1.000
"	"	"	female	0.09 " " "

I have made a quantitative analysis of three specimens of healthy human blood with the following results:—

	Quantity of Blood. *grains.*	Cholesterine. *grains.*	Proportion per 1,000 pts.
Venous blood from the arm; male æt. 35	312.083	0.139	0.445
Do. do. do. (coloured) æt. 22	187.843	0.123	0.658
Do. do. do. æt. 24	102.680	0.077	0.751

These three analyses were all carried on at the same time, and each specimen subjected to precisely the same process. The results show a wide range within the limits of health. The difference was not due to any variation relating to the digestive process, as the specimens were all drawn at the same time, and were taken from prisoners on Blackwell's Island, who were subjected to the same diet, and ate at the same time. It will be seen by this table that I have obtained from five to eight times as much as is indicated by Becquerel and Rodier. I can only explain this by the fact that I operated on the whole blood, while they only analyzed the serum. Boudet states that it is necessary to make three to four copious bleedings, and mix the serum in order to obtain a sufficient quantity for a satisfactory analysis. I have operated on about fifty grains of blood with success, and have no doubt but that I would be able to extract the cholesterine in a crystalline form, and estimate its quantity in fifteen and twenty grains. The purity of the extract can easily be demonstrated by a microscopic examination. I conclude, then, that a much larger quantity of cholesterine exists normally in the blood than has been supposed, and that its variations, in different persons, within the limits of health, are considerable.

The next question which naturally arises is the origin of the cholesterine. When we examine the situations in which it is found, we find that it exists in largest quantity in the substance of the brain and nerves. It is also found in the substance of the liver, probably in the bile which is contained in this organ, and the crystalline lens, but with these exceptions it is found

only in the nervous system and blood. Two views present themselves with regard to its origin. Cholesterine is deposited in the nervous matter from the blood, or is formed in the brain and taken up by the blood. This is a question, however, which can be settled experimentally, by analyzing the blood for cholesterine as it goes to the brain by the carotid, and as it comes from the brain by the internal jugular. The cholesterine being found also in the nerves, and, of course, a large quantity of nervous matter existing in the extremities, it is desirable at the same time to make an analysis of the venous blood from the general system.

With reference to this question the following experiment was made:—

Exp. 3. A medium sized dog, about six months old, fasting, was put under the influence of ether. The carotid and internal jugular were exposed on the left side, and the animal allowed to come out from the effects of the anæsthetic. Two hours after, he was again etherized, and the blood taken from the following vessels in the order in which they are named: 1, Internal jugular; 2, Carotid; 3, Vena cava; 4, Hepatic veins; 5, Hepatic artery; 6, Portal vein. In the operation of drawing the blood from the abdominal vessels, immediately after opening the abdomen a ligature was applied to the vena cava and a little blood taken, which prevented the blood from the inferior extremities from mixing with the hepatic blood. The blood was then taken from the hepatic veins, a matter of some difficulty, as it is always more or less mingled with blood returning through the thoracic vena cava, and a ligature applied to the hepatic artery and portal vein. The blood was then drawn from the hepatic artery and portal vein.[1] A quantity of bile was then taken from the gall-bladder, and a portion taken from the substance of the brain. These specimens were received into carefully weighed vessels and weighed; but as I failed to make a quantitative analysis, my process of extraction not having been perfected, it is unnecessary to enter into their details. They were then dried and pulverized, treated with ether, evaporated, the residue extracted with hot alcohol, allowed to evaporate spontaneously, and examined with magnifying powers of 70, 270, and 400 diameters successively. The residue of the bile and brain were found to consist of nearly pure cholesterine, but in all the other specimens, excepting that from the internal jugular, the appearance of cholesterine was doubtful. They all contained, with masses

[1] The operation of collecting the blood from any particular vessel is by no means so easy as might at first be supposed. The greatest care is necessary in order to obtain it unmixed. This is particularly so in the case of the hepatic vein, the unmixed blood from which it is exceedingly difficult to obtain. In drawing blood, the operation must be done as rapidly as possible to avoid the derangements of the circulation which arise from exposure of the vessels, pressure, etc. In taking blood going to and coming from a part, it must always be taken from the vein first; as ligating or compressing the artery would of course arrest the circulation. As the blood in the arterial system is not subject to the same changes in composition as the blood in the different veins, any specimen of the arterial blood will represent the blood going to a part, unless, like the liver, it receives blood from the venous system. The collection of blood I have found the most difficult part of these investigations.

of ordinary fat, crystals of stercorine.[1] There were a few distinct plates of cholesterine in the specimen from the internal jugular. The specimens were then treated with a solution of caustic potash and set aside. In two days part of the potash was removed with bibulous paper and portions of the precipitates taken out, placed upon slides, and examined microscopically with $\frac{1}{6}$th and $\frac{1}{12}$th inch objectives successively. The watch-glasses were then set aside, carefully protected from the dust, and examined again ten days after, when they had become entirely dry. The following was the result of the examinations of the extracts of blood from the carotid, internal jugular, vena cava, and the extract of the brain. The examination of the other specimens has nothing to do with the question now under consideration, and their description is deferred.

Blood from the carotid artery.—First examination, three days after the operation, discovered a large number of small crystals of stercorine and masses of fat; but after the most careful examination, prolonged for two hours, I failed to discover any crystals of cholesterine. The appearance is represented in Fig. 2.

The second examination, eleven days after, discovered a small quantity of cholesterine mixed with the matters noted in the first examination. This appearance is represented in Fig. 3.

Substance of the brain.—All the microscopic examinations of the extract from the brain showed crystals of cholesterine in large quantity. The crystals from the brain are described by Robin as being thinner and more elongated than those found in other situations.[2] This peculiarity I also noticed. The appearance is represented in Fig. 4.

Blood from the internal jugular.—In the first examination of the specimen from the internal jugular, after the blood had been treated with ether, the ether allowed to evaporate, and the residue extracted with hot alcohol, well-marked plates of cholesterine were noted. At this time it could not be discovered in any of the other specimens of blood after the most careful and patient examination. After the caustic potash had been added, the cholesterine was demonstrated in large quantity, with a few crystals of stercorine. The appearance is represented in Fig. 5, which was drawn eleven days after the blood was collected. Another examination was made on the following day, which showed, in addition to the cholesterine, a considerable quantity of stercorine. (See Fig. 6.)

Blood from the vena cava.—The extract of the blood from the vena cava, examined eleven days after the blood was drawn, showed a large quantity of stercorine and a few crystals of cholesterine. The cholesterine was distinct but not very abundant. (See Fig. 7.)

These experiments, the first that I made on this subject, demonstrate the following facts: 1. That the brain contains a large quantity of choles-

[1] Stercorine, or seroline, is a non-saponifiable fatty substance resembling the cholesterine in many of its chemical properties, but fusing at a much lower temperature. It was discovered in the serum of the blood by Boudet about 1833. It crystallizes in the form of needles, which will be more particularly described when we treat of the extraction of this substance from the feces. As I have found it in great abundance in the feces, and am disposed to doubt its existence as a natural constituent of the serum of the blood, I have called it *stercorine*, for reasons which will be more fully exposed further on.

[2] Traité de Chimie Anatomique, Robin and Verdeil, tome iii. p. 57.

terine (which had, however, been previously established). 2. That the blood going to the brain contains a small quantity of cholesterine, while the blood coming from the brain contains a large quantity. 3. That the blood coming from the lower extremities and pelvic organs contains more cholesterine than the blood carried to them by the arterial system.

It was only necessary to confirm these statements by further investigation, to be enabled to deduce from them the following important conclusion: *i. e.* That cholesterine is formed in some of the tissues of the body; and, judging from the fact that the nervous tissue is the only one in which it is found, and that the blood gains it in its passage through the great nervous centre, it is formed, in great part, by the nervous system. After the first experiment, which almost confirmed the supposition with which I had started, I directed my attention to the perfection of a process by which I might make an accurate quantitative analysis of the blood for cholesterine, so as to be able to state positively that it gained cholesterine in its passage through certain organs, and furthermore to determine the amount of increase. After a number of experiments, I fixed upon the process which I have minutely described in the first part of this article, and made the following experiments for the purpose of ascertaining the quantity of cholesterine produced in the brain.

Exp. 4. A medium sized adult dog was put under the influence of ether and the carotid artery, internal jugular, and femoral veins exposed. Specimens of blood were drawn, first from the internal jugular, next from the carotid, and last, from the femoral vein. These specimens were received into carefully weighed vessels, and weighed.

They were then analyzed for cholesterine by the process described on pages 313–315, and the following results obtained :—

	Quantity of Blood. *grains.*	Cholesterine. *grains.*	Cholesterine per 1,000 pts.
Carotid	179.462	0.139	0.774
Internal jugular . .	134.780	0.108	0.801
Femoral vein	133.886	0.108	0.806

Percentage of increase in blood from the jugular over the arterial blood 3.488
Do. do. of blood from femoral vein 4.134

This experiment shows an increase in the quantity of cholesterine in the blood during its passage through the brain and an increase, even a little greater, in the blood passing through the vessels of the posterior extremity. To facilitate the operation, however, the animal was brought completely under the influence of ether, which, from its action on the brain, would not improbably produce some temporary disturbance in the nutrition of that organ, and consequently interfere with the experiment. For the purpose of avoiding this difficulty I performed the following experiments without administering an anæsthetic.

Exp. 5. A small young dog was secured to the operating table, and the internal jugular and carotid exposed on the right side. Blood was taken, first from the jugular, and afterwards from the carotid. The femoral vein

on the same side was then exposed and a specimen of blood taken from that vessel. The animal was very quiet under the operation, though no anaesthetic was used, so that the blood was drawn without any difficulty and without the slightest admixture.

The three specimens were analyzed for cholesterine with the following results:—

	Quantity of Blood. *grains.*	Cholesterine. *grains.*	Cholesterine per 1,000 pts.
Carotid	143.625	0.679	0.967
Internal jugular . .	29.956	0.046	1.545
Femoral vein . . .	45.035	0.046	1.028

Percentage of increase in blood from the jugular over arterial blood 59.772
Do. do. of blood from the femoral vein . . . 6.308

Exp. 6. A large and powerful dog was secured to the operating table and the carotid and internal jugular exposed. Specimens of blood were taken from these vessels, first from the jugular, carefully weighed and analyzed for cholesterine in the usual way. The following results were obtained:—

	Blood. *grains.*	Cholesterine. *grains.*	Proportion in 1,000 pts.
Carotid	140.847	0.108	0.768
Internal jugular . .	97.811	0.092	0.947

Percentage of increase in passing through the brain . . . 23.307

Exp. 5 shows a very considerable increase in the quantity of cholesterine in the blood passing through the brain, while it is comparatively slight in the blood of the femoral vein. The proportion of cholesterine is also large in the arterial blood compared with other observations.

Exp. 6 shows but a slight difference in the quantity of cholesterine in the arterial blood in the two animals; the proportion in the animal that was etherized being 0.774 pts. per 1,000, and in the animal that was not etherized 0.768 per 1,000, the difference being but 0.006; but, as I had suspected, the ether had an influence on the quantity of cholesterine absorbed by the blood in its passage through the brain. In the first instance the increase was but 3.488 per cent., while in the latter it was 23.307. Unfortunately the blood was not taken from the femoral vein. I intended to take blood from the abdominal organs, but after opening the abdomen the struggles of the animal were so violent that this was impossible, and he was killed.

What are our natural conclusions, from the preceding experiments, with regard to the origin of cholesterine in the economy? It has been found that the brain and nerves contain a large quantity of this substance, which is found in none other of the tissues of the body. The preceding experiments, especially Exps. 5 and 6, show that the blood which comes from the brain contains a much larger quantity of cholesterine than the blood which goes to this organ.

The conclusion is, then, that it is produced in the brain, and thence absorbed by the blood.

But the brain is not the only part where cholesterine is produced. It

will be seen by Exp. 4 that there is 4.134 per cent., and in Exp. 5, 6.308 per cent. of increase in the cholesterine in the passage of the blood through the inferior extremities, and probably about the same in other parts of the muscular system. In examining these tissues chemically, we find that the muscles contain no cholesterine, but that it is abundant in the nerves; and as we have found that the proportion of cholesterine is immensely increased in the passage of the blood through the great centre of the nervous system, taken, as the specimens examined were, from the internal jugular, which collects the blood from the brain and very little from the muscular system, it is rendered almost certain, that in the general venous system, the cholesterine which the blood contains is produced in the substance of the nerves.

If this be true, and if, as I hope to show, the cholesterine be a product of the destructive assimilation of nervous tissue, its production would be proportionate to the activity of the nutrition of the nerves; and anything which interfered to any great extent with their nutrition would diminish the quantity of cholesterine produced. In the production of urea by the general system, which is an analogous process, muscular activity increases the quantity, and inaction diminishes it, on account of the effect upon nutrition. In cases of paralysis we have a diminution of the nutritive forces in the parts affected, especially of the nervous system, which, after a time, becomes so disorganized, that although the cause of the paralysis be removed, the nerves cannot resume their functions. It is true we have this to a certain extent in the muscles; but it is by no means as marked as it is in the nerves. We should be able then to confirm the observations on animals, by examining the blood in cases of paralysis; when we should find a very marked difference in the quantity of cholesterine, between the venous blood coming from the paralyzed parts, and that from other parts of the body. With this in view I made analyses of the blood from both arms in three cases of hemiplegia, which seemed to me most suitable for such a comparison.

CASE I. Sarah Rumsby, æt. 47, affected with hemiplegia of the left side. Two years ago she was taken with apoplexy, and was insensible for three days. When she recovered consciousness she found herself paralyzed on the left side. Said she had epilepsy four or five years before the attack of apoplexy. Now she has entire paralysis of motion on the affected side, with the exception of some slight power over the fingers, but sensation is perfect. The speech is not affected. The general health is good.

CASE II. Anna Wilson, æt. 23, Irish, affected with hemiplegia of the right side. Four months ago she was taken with apoplexy, from which she recovered in one day with loss of motion and sensation on the right side. She is now improving and can use the right arm slightly. The leg is not so much improved, because she will make no effort to use it.

CASE III. Honora Sullivan, Irish, æt. 40, affected with hemiplegia of right side. About six months ago she was taken with apoplexy, and recovered consciousness the next day, with paralysis. The leg was less affected than the arm, from the first. The cause was supposed by Dr. Flint,

the attending physician, to be due to an embolus. Her condition is now about the same as regards the arm, but the leg has somewhat improved.

These cases all occurred at the Blackwell's Island Hospital. The treatment in all consisted of good diet, frictions, passive motion, and use of the paralyzed members as much as possible.

A small quantity of blood was drawn from both arms in these three cases. It was drawn from the paralyzed side, in each instance, with great difficulty, and but a small quantity could be obtained.

The specimens were all examined for cholesterine with the following results:—

Table of Quantity of Cholesterine in Blood of Paralyzed and Sound Sides in three cases of Hemiplegia.

	Blood.	Cholesterine.	Cholesterine per 1,000.
	grains.	*grains.*	
Case I. Paralyzed side.	55.458	—	The watch-glass contained 0.031 grain of a substance, but the most careful examination failed to show a single crystal of cholesterine.
Do. Sound side.	128.407	0.062	0.481.
Case II. Paralyzed side.	18.381	—	Same as Case I.
Do. Sound side.	66.396	0.062	0.808.
Case III. Paralyzed side.	21.842	—	Same as Case I.
Do. Sound side.	52.261	0.031	0.579.

The result of these examinations is very interesting: not a single crystal of cholesterine was found in any of the three specimens of blood from the paralyzed side, while about the normal quantity was found in the blood from the sound side. As the nutrition of other tissues is interfered with in paralysis, it is impossible to say positively from these observations alone, that the cholesterine is produced in the nervous system only. But the nutrition of the nerves is undoubtedly most affected; and this observation, taken in connection with the preceding experiments on animals, seem to settle where the cholesterine is produced.

We may extend our first conclusion, then, and state that the *cholesterine is produced in the substance of the nervous system.*

Before entering upon the character of cholesterine, and inquiring whether it be an excrementitious or a recrementitious product, we will endeavour to follow it out in the system and ascertain if there be any organ which separates it from the blood. In pursuing this question, the method will be adopted that has been employed in investigating its origin; that is, analyzing the blood as it goes to and comes from certain organs. The organ which we would be led first to examine is the liver, as it is the only gland, the product of which contains cholesterine, which, if not manufactured in the gland itself, must be separated from the blood.

In the first series of experiments which I performed on this subject, I endeavoured to show on the same animal the origin of cholesterine in certain parts, and its removal from the body. In these experiments, which were only approximative, as I had not then succeeded in extracting the cholesterine perfectly pure, I commenced with the arterial blood, examining it as it went into the brain by the carotid, analyzing the substance of the brain, then analyzing the blood as it came out of the brain by the internal jugular, examining the blood as it went into the liver by the hepatic artery and portal vein, examining the secretion of the liver, then the blood as it came out of the liver by the hepatic vein, examining also the blood of the vena cava in the abdomen. The analyses of the blood from the carotid, internal jugular, and vena cava have already been referred to, pages 323, 324, in treating of the origin of the cholesterine. It will be remembered that there was a large quantity of this substance in the internal jugular, and but a small quantity in the carotid, showing that it was *formed* in the brain. I now give the conclusion of those observations, which bears upon the *separation* of the cholesterine from the blood.

Exp. 7. Specimens of blood were taken from the hepatic artery, portal vein and hepatic vein, and a small quantity of bile from the gall-bladder. These specimens were treated in the manner already indicated in Exp. 3; *i. e.*, evaporated and pulverized, extracted with ether, the ether evaporated, and the residue extracted with boiling alcohol, this evaporated, a solution of caustic potash added and then subjected to a microscopic examination.

Blood from the portal vein.—Microscopic examination of the extract from the portal vein showed quite a number of crystals of cholesterine, which are represented in Fig. 8. These were observed after the fluid had nearly evaporated.

Blood from the hepatic artery.—Microscopic examination of the extract from the hepatic artery, made after the fluid had nearly evaporated, showed a considerable amount of cholesterine; more than was observed in the preceding specimen. (See Fig. 9.) There were also observed a few crystals of stercorine, represented in Fig. 10.

Blood from the hepatic vein.—The first examination of the extract from the hepatic vein, which was made just before the potash was added, showed a number of fatty masses with some crystals of stercorine. The solution of potash was then added, and two days after, another careful examination was made, discovering nothing but fatty globules and granules. (See Fig. 11.) The watch-glass was then set aside, and was examined eleven days after, when the fluid had entirely evaporated. At this examination, a few crystals of cholesterine were observed for the first time. (See Fig. 12.) There were also a number of crystals of margaric and stearic acid.

Bile.—All the examinations of the extract from the bile showed cholesterine; the precipitate consisted, indeed, of this substance in a nearly pure state. Fig. 13 represents some of the crystals which were observed in this specimen.

This series of experiments being taken in connection with the first observations on the carotid and internal jugular, while the one series demonstrates pretty conclusively that cholesterine is formed in the brain, the other shows

that it disappears, in a measure, from the blood in its passage through the liver, and is found in the bile. In other words, it is formed in the nervous tissue, and prevented from accumulation in the blood by its excretion by the liver. This suggests an interesting series of inquiries; and this fact, substantiated, would be as important to the pathologist as to the physiologist. But in order to settle this important question, it is necessary to do something more than make an approximative estimate of the quantity of cholesterine removed from the blood by the liver. The quantity which is thus removed in the passage of the blood through this organ should be estimated, if possible, as closely as the quantity which the blood gains in its passage through the brain. But this estimate is more difficult. The operation for obtaining the blood, in the first place, is much more serious than that for obtaining blood from the carotid and internal jugular. It is very difficult to obtain the unmixed blood from the hepatic vein; and the exposure of the liver, if prolonged, must interfere with its eliminative function, in the same way that exposure of the kidneys arrests, in a few moments, the flow from the ureter. It is probable, however, that the administration of ether does not interfere with the elimination of cholesterine by the liver as it does, apparently, with its formation in the brain. Anæsthetics, we know, have a peculiar and special action on the brain, but do not interfere with the functions of vegetative life, like secretion or excretion; and, we would suppose, would not interfere with the depurative function of the liver. It is fortunate that this is the case, for the operation of taking blood from the abdominal vessels is immensely increased in difficulty by the struggles of an animal not under the influence of an anæsthetic, so much so, indeed, that I failed entirely in obtaining any blood from one animal (the one used in Exp. 6), which was not etherized. It was a very powerful dog, and his struggles were so violent that it was impossible to collect the blood accurately from the abdominal vessels, and the attempt was abandoned. With the view of settling the question of the disappearance of a portion of the cholesterine of the blood in its passage through the liver, by an accurate quantitative analysis, I repeated the operation for drawing blood from the vessels which go into, and emerge from the liver. In my first trial the blood was drawn so unsatisfactorily, and the operation was so prolonged, that I did not think it worth while to complete the analysis, and abandoned the experiment. In the following one I was more successful.

Exp. 8. A good-sized bitch (pregnant) was brought completely under the influence of ether, the abdomen laid freely open, and blood drawn, first from the hepatic vein, and next from the portal vein. The taking of the blood was entirely satisfactory, the operation being done rapidly, and the blood collected without any admixture. A specimen of blood was then taken from the carotid to represent the blood from the hepatic artery.

The three specimens of blood were then examined in the usual way for cholesterine, with the following results:—

	Blood. *grains.*	Cholesterine. *grains.*	Cholesterine in 1000 pts.
Arterial blood . . .	159.537	0.200	1.257
Portal vein . . .	168.257	0.170	1.009
Hepatic vein . . .	79.848	0.077	0.964

Percentage of loss in arterial blood in its passage through the liver	23.309
Do. do. do. of portal vein	4.460

This experiment proves positively that there was good ground for supposing from Exp. 7, namely, that cholesterine is separated from the blood by the liver; and here we may note, in passing, a striking coincidence between the analysis in Exp. 6, when the blood was studied in its passage through the brain, and the one just mentioned, when the blood was studied in its passage through the liver. *The gain of the arterial blood in cholesterine in passing through the brain was* 23.307 *per cent., and the loss of this substance in passing through the liver is* 23.309 *per cent.* There must be, of course, the same quantity separated by the liver that was formed by the nervous system, it being formed, indeed, only to be separated by this organ, its formation being continuous, and its removal necessarily the same, in order to prevent its accumulation in the circulating fluid. The almost exact coincidence between these two quantities, in specimens taken from different animals, though not at all necessary to prove the fact just mentioned, is still very striking.

It is shown by Exp. 8 that the portal blood, as it goes into the liver, contains but a small percentage of cholesterine over the blood of the hepatic vein, while the percentage in the arterial blood is large. The arterial blood is the mixed blood of the entire system, and as it probably passes through no organ before it gets to the liver which diminishes its cholesterine, contains a quantity of this substance, which must be removed. The portal blood, coming from a limited part of the system, contains less of this substance, though it gives up a certain quantity. In the circulation of the liver, the portal system largely predominates, and is necessary to other important functions of this organ, such as the production of sugar and fat. Soon after the portal vein enters the liver, its blood becomes mixed with that from the hepatic artery,[1] and from this mixture the cholesterine is separated. It is only necessary that blood, containing a certain quantity of cholesterine, should come in contact with the bile-secreting cells, in order that this substance be separated. The fact that it is eliminated by the liver is proven with much less difficulty than that it is formed in the nervous system. In fact, its presence in the bile, the necessity of its constant re-

[1] According to Robin, the branches of the hepatic artery are distributed almost entirely in the interlobular plexuses, and on the walls of the hepatic duct and portal vein, and do not find their way into the substance of the lobules.—*Dictionnaire de Médecine, de Chirurgie, de Pharmacie, des Sciences accessoires et de l'Art vétérinaire de* P. H. Nysten; *onzième édition revue et corrigé.* Par E. Littré et Ch. Robin. Paris, 1858. Article *Foie.*

moval from the blood, which is consequent on its constant formation and absorption by this fluid, are almost sufficient in themselves to warrant the conclusion that it is removed by the liver. This, however, is put beyond a doubt by the preceding analysis of the blood going to and coming from this organ.

Another link, then, is added to the chain of facts which make up the history of cholesterine. The first is that—

Cholesterine is formed in the brain and nervous system, and absorbed by the blood.

The second, which has just been proven, is that—

Cholesterine, formed in these situations, and absorbed by the blood, is separated from the blood in its passage through the liver.

The next question, in following out this line of inquiry, is, What becomes of the cholesterine which is separated from the blood? This question is very easily answered, and necessitates only an examination of one of the products of the liver, the bile.

The Bile.—In the few remarks with which I prefaced this article, I spoke of the various opinions which are held among physiologists with reference to the function of the bile—some regarding it as purely excrementitious, others placing it among the recrementitious fluids. I detailed experiments which led me to think that it had two distinct functions: one, which is recrementitious, and is probably concerned in digestion to an important degree, but which it is not designed to take up in this connection; the other, which is excrementitious, and which is necessarily taken up in our discussion of the important principle which we are now considering. A glance at the composition of the bile will show that it is an exceedingly complex fluid; and physiological investigations into the destination of certain of its ingredients, by Bidder and Schmidt, Dalton and others, have shown that they are not discharged from the body, but resorbed by the blood; though the failure to detect them in the portal blood by the appropriate tests, shows that in this resorption they probably undergo some alteration.[1] These substances, which have heretofore been considered the most important ingredients of the bile, though their function is obscure, are the glyco-cholate and tauro-cholate of soda, discovered by Strecker in the bile of the ox in 1848. The following is the composition of the bile given in Dalton's Physiology, which is "based on the calculations of Berzelius, Frerichs, and Lehmann."[2]

[1] For a very complete account of the bile, with original investigations into the destination of the biliary salts, the reader is referred to an article published by Prof. John C. Dalton, Jr., in the American Journal of the Medical Sciences, October, 1857, and the chapter on bile in Dalton's Physiology.

[2] Dalton's Physiology, second edition, page 158.

Composition of Ox Bile.

Water	888.00
Glyco-cholate of soda Tauro-cholate of soda	90.00
Biliverdine Fats Oleates, margarates, and stearates of soda and potassa Cholesterine	13.42
Chloride of sodium Phosphate of soda Phosphate of lime Phosphate of magnesia Carbonates of soda and potassa	15.24
Mucus of the gall-bladder	1.34
	1000.00

Of the above ingredients of the bile, we have the biliverdine, which is simply a colouring matter, the fats, with the oleates, margarates, and stearates, which, with the biliary salts, are said to hold the cholesterine in solution, the chloride of sodium, present in all the animal fluids, the phosphates and carbonates, which are simply excreted, and are also ingredients of the urine, leaving, as the most important constituents, of which the function is least understood, the biliary salts and the cholesterine. The biliary salts are probably recrementitious; but the cholesterine is one of the great products of the waste of the system. The bile, then, presents the combined character, so far as its chemical composition is concerned, of a secretion and of an excretion. Let us now contrast these two properties, and see what this fluid has in common with the secretions, and how it obeys the laws which regulate the excretions. In doing this we will first contrast some of the important distinctions between these two classes of products.

Secretions are characterized by certain elements which are manufactured in the substance of the gland, and are found in no other situation. Such is the pancreatine for the pancreatic juice, the pepsin for the gastric juice, the ptyaline for the saliva, and, we may add, the glyco-cholate and tauro-cholate of soda for the bile.

These substances first make their appearance in the substance of the gland itself; they do not pre-exist in the blood; they are discharged from the gland for a special purpose, and when there is no necessity for their action, the discharge does not take place. Illustrations of this are to be found in the digestive fluids, which are true secretions; only poured out when this function is called into action by the ingestion of food, and not discharged from the body, but their elements taken up again by the blood when their function is accomplished. Thus the gastric or pancreatic fluids are never secreted until food is taken into the alimentary canal, and are resorbed with the digested matters.

The flow of the secretions is intermittent, and the gland, during the period of repose, manufactures the elements of the secretion, which are washed out at the duct when the appropriate stimulus (of food, for example) causes a determination of blood to the organ. The gland manufactures the elements of the secretion, and the blood furnishes the menstruum, the water, by means of which they are dissolved and emptied into the duct. If we expose the pancreas of an animal during the intervals of digestion, it is pale and bloodless; no fluid flows from the duct; but the elements of the pancreatic juice are, nevertheless, in the gland, for if we macerate it in water, we may dissolve them out, and make an artificial pancreatic juice which will have all the reactions and digestive properties of the natural secretion. But if we expose the pancreas of an animal during digestion, the gland is turgid with blood; the secretion flows from the duct, and the products of the gland are being washed out by the blood—a process which we imitated when we dissolved them out by maceration in water. The late brilliant experiments of Bernard have shown that the function of the glands is regulated by the nervous system, and that the galvanization of certain nerves, by which the nervous force is imitated, will cause a determination of blood to the organ, and induce secretion, while the galvanization of other nerves will contract the vessels, and arrest secretion.

The substances which characterize the secretions, as they are manufactured in the glands and do not pre-exist in the blood, do not accumulate in the blood when the gland is removed, or its functions are interfered with.

The distinctive characters of the secretions, in fact, may be summed up thus:—

Their elements first appear in the glands, and do not pre-exist in the blood. They are not discharged from the body (with the exception of the milk, which is destined for the nourishment of the child). Their flow is intermittent. They are destined to assist in some of the nutritive functions of the body.

Excretions, of which the urine may be taken as a type, have entirely different characteristics.

Excrementitious substances do not first make their appearance in the organs which separate them, but are produced in the general system.

They pre-exist in the blood, having been absorbed by this fluid from the parts of the system in which they are formed, are carried to particular organs, and separated from the blood for the sole purpose of being expelled from the body. An illustration of this is to be found in the urea, which has been detected in the blood and urine, and some of the tissues of the body. This substance, one of the most important excrementitious products, is absorbed by the blood from certain parts of the system, carried to the kidneys, there separated from the blood, and discharged from the body. Though the gastric and pancreatic fluids, and all the secretions proper, are

resorbed with the food after they have acted upon it, the urea may remain any length of time in the bladder, but it is never absorbed.

The flow of the excretions is constant. No period of repose is necessary for the gland to manufacture their elements, as they all pre-exist in the blood. Nutrition is constant, and destructive assimilation, or waste, which necessitates nutrition or repair, is likewise constant. The blood supplies all the wants of the system, and receives all the products of its decay. As the blood is continually being impoverished, it must be regenerated from without; and this is done by food, which is prepared for absorption by digestion. The secreted fluids are mostly concerned in digestion, and as this is an occasional process, the secretions are intermittent. But waste is continually going on, and excrementitious substances are continually forming; and while the necessity for the secretions is occasional, the necessity for the excretions is constant. Though the actual discharge of the latter from the body is occasional, they are constantly being separated from the blood, and accumulate in receptacles, whence they are discharged at appropriate intervals. No such receptacles exist for the secretions proper, except in the instance of the milk, which accumulates in the ducts of the mammary gland, and is the only secretion which is discharged from the body.

If the secreting glands take on an excretory function, as is an occasional pathological occurrence, their flow becomes continuous. We have an example of this in the occasional separation of the urea from the blood by the gastric tubuli. When the kidneys become so affected by disease as to be unable to separate the urea from the system, the accumulation of this excrement in the blood frequently induces other organs to attempt its removal. The gastric tubuli take on that function, and produce a fluid which contains urea. The gastric juice, if we may now so term it, is no longer a secretion, but an excretion, and we find that its flow is no longer intermittent and dependent upon the stimulus of food introduced into the stomach, but is constant, and continues until the irritation caused by the decomposing urea in the stomach induces an inflammation which prevents further secretion. Thus we have an example of an intermittent *secretion*, characterized by a substance manufactured in the gland and not pre-existing in the blood, changed into a constant *excretion*, characterized by a substance which is not manufactured in the gland but pre-exists in the blood.

The substances which characterize the excretions accumulate in the blood when the organ which eliminates them is removed, or its functions are interfered with. It is to this fact that we owed our knowledge that urea pre-existed in the blood. It was detected in that fluid when it had accumulated in animals from which the kidneys had been removed, and in cases of Bright's disease of the kidneys, before our chemical processes were sufficiently delicate to detect it in healthy blood, when the quantity is kept down to a very low standard by its constant elimination by the kidneys.

The characters of the excretions, then, are entirely opposite to those of the secretions.

Their elements pre-exist in the blood, and are not manufactured in the substance of the organs which eliminate them. Their flow is constant. They are separated from the blood merely to be discharged from the body, and are not destined to assist in any of the nutritive functions of the body.

Having thus contrasted the secretions and the excretions, let us examine the bile and note what are the characters which it has in common with either or both of these products.

The bile is characterized by two kinds of principles. One of them, the glyco-cholate and tauro-cholate of soda, *manufactured* in the liver, found in no other fluid than the bile, does not pre-exist in the blood, and associates the bile with the secretions. The other, the cholesterine, pre-exists in the blood and is simply *separated* from it by the liver, giving the bile one of the characters of an excretion.

The biliary salts (the glyco-cholate and tauro-cholate of soda) are discharged into the intestinal canal for a special purpose; and this discharge takes place at the beginning of the digestive act. If we expose the liver and gall-bladder of a dog which has not taken food, we will find the gall-bladder distended with bile; but if we examine these organs when digestion is going on, the gall-bladder will be found nearly empty. It is true that after prolonged fasting the bile is discharged into the alimentary canal, but it must be remembered that it contains another ingredient, the cholesterine, which must be discharged from the body, as we will see presently. The biliary salts are not discharged from the body. Dr. Dalton has shown that the substances extracted from the contents of the large intestine by evaporation, extraction of the residue with alcohol and precipitation with ether, will not react with Pettenkoffer's test, which is a very delicate test for the biliary salts. I have treated the feces of the human subject in the same way with the same result. These salts, therefore, are not discharged from the body unchanged. The next question to determine is whether they are discharged from the body in a modified form. They contain a certain amount of sulphur, of which, as has been shown by Bidder and Schmidt, only one-fifteenth part of the entire quantity which enters the intestine with the bile can be detected in the feces. As sulphur is an elementary substance, it cannot be decomposed; and the biliary salts, in this passage down the alimentary canal, must be absorbed. It is true that these salts cannot be detected in the blood coming from the intestines, but we cannot detect the pancreatine of the pancreatic juice, the pepsin or lactic acid of the gastric juice in the portal blood, yet these are absorbed by the mucous membrane of the intestinal tube, changed by their union with the elements they have digested. It is probable that an analogous change takes place in the glyco-cholate and tauro-cholate of soda, which prevents them from

being detected in the blood by the ordinary tests. These facts, also, place the bile among the secretions.

On the other hand, cholesterine pre-exists in the blood, having been absorbed by this fluid from certain parts of the system, is carried to the liver, and here separated for the sole purpose of being discharged from the body. The same general remarks apply to this substance as to the urea. This places the bile among the excretions.

The flow of the secretions is intermittent. This is not absolutely true of the bile, but the discharge of this fluid is remittent. Dr. Dalton[1] has reported a series of interesting experiments upon an animal with a duodenal fistula. In this observation ten grains of dry biliary matter were discharged into the duodenum of a dog weighing thirty-six and a half pounds, immediately after feeding. At the end of the first hour it had fallen to four grains; it continued at three and a half to four and a half grains up to the eighteenth hour, when the quantity was inappreciable; at the twenty-first hour it was one grain; the twenty-fourth, three and a quarter grains, and the twenty-fifth three grains. The fluid was drawn for fifteen minutes each time, evaporated to dryness, extracted with absolute alcohol, precipitated with ether, the ether precipitate dried, and weighed as representing the quantity of biliary matter present. These experiments apply to the time when the bile is discharged into the intestine; but as most animals have a gall-bladder, which collects the bile as it is secreted, it does not show when this fluid is formed by the liver. Schwann, Bidder and Schmidt, Arnold, Kölliker, and Müller, have made experiments bearing upon the latter point, by ligating the ductus communis choledochus and making a fistula into the fundus of the gall-bladder. The experiments of these observers vary somewhat with regard to the time when the secretion of the bile is at its maximum. In the animal referred to on page 308, in which a fistula was made into the fundus of the gall-bladder, the bile was collected for thirty minutes immediately after feeding, one hour after, and then at intervals of two hours during the remainder of the twenty-four hours. The specimens of bile thus collected were carefully weighed, evaporated to dryness, and the proportion of dry residue taken. The accompanying table shows the results of these observations, which were made twelve days after the operation, when the animal, which weighed originally twelve pounds, had lost two pounds. His appetite was ravenous at the time of the experiment.

[1] Dalton on the Constitution and Physiology of the Bile. Loc. cit.

Table of the variations of the bile in the twenty-four hours. At each observation the bile was drawn for precisely thirty minutes. Dog with a fistula into the gall-bladder. Weight ten pounds.

Time after Feeding.	Fresh Bile.	Dried Bile.	Percentage of Dry Residue.
	grains.	*grains.*	
Immediately	8.103	0.370	4.566
One hour	20.527	0.586	2.854
Two hours	35.760	1.080	3.023
Four hours	38.939	1.404	3.605
Six hours	22.209	0.987	4.450
Eight hours	36.577	1.327	3.628
Ten hours	24.447	0.833	3.407
Twelve hours	5.710	6.247	4.325
Fourteen hours	5.000	0.170	3.400
Sixteen hours	8.643	0.309	3.575
Eighteen hours	9.970	0.277	2.778
Twenty hours	4.769	0.170	3.565
Twenty-two hours	7.578	0.293	3.866
Twenty-four hours	15.001	0.885	5.233

This table shows a regular increase in the quantity of bile discharged from the fistula from the time of feeding up to four hours after. It diminished at the sixth hour, rose again at the eighth hour, but then gradually diminished to the fourteenth hour. We then have a slight increase the sixteenth and eighteenth hours, and the twentieth hour it falls to its minimum. It then increased slightly the twenty-second hour, and mounted considerably the twenty-fourth hour, when the observations were concluded. Disregarding slight variations in the quantity, which might be accidental, it may be stated in general terms, that *the maximum flow of bile from the liver is from the second to the eighth hour after feeding; during which time it is about stationary. In this experiment it was at its minimum the twentieth hour after feeding.* This observation agrees with those of Bidder and Schmidt as regards the time when the bile begins to increase in quantity; but these observers state that it is at its maximum at the twelfth to the fifteenth hour. This, however, is not material to the question now under consideration. We wished to establish the fact that the quantity of bile secreted varied considerably during the various stages of the digestive act; a character which approximates it to other secretions. The flow of the bile is not intermittent, because it contains a substance which is excrementitious; but it is remittent, having a definite relation to the digestive act, because it contains substances which are recrementitious and are in some way connected with the process of digestion.

The continuous, though remittent, flow of the bile allies it with the excretions. There is no time, in health, when the bile is not separated from the blood. In animals that go through the process of hibernation, the bile continues to be secreted, though no food is taken into the alimentary canal. Nutrition, though much diminished in activity, goes on during this state,

and the urea and cholesterine must be separated from the blood. The formation of the bile and urine, therefore, is not interrupted. The bile is secreted also in the fœtus, before any nourishment is taken into the alimentary canal, when none of the other digestive fluids are formed. This character it has in common with the urine, and this places it among the excretions.

The elements of secretion never accumulate in the system when the secretion is interfered with; while the elements of excretion do accumulate in the blood in such cases, and produce their toxic effects. Experimenters have often analyzed the blood for the biliary salts in cases of serious disease of the liver, marked by symptoms of bile poisoning, regarding these as the only important elements of the bile; but they have never been detected. I have made no observations on this point, for the fact that the glyco-cholates and tauro-cholates of soda do not accumulate in the blood in diseases of the liver has long been settled. This stamps these substances as products of *secretion;* but we will see when some of the pathological conditions of the cholesterine are taken up, that this substance does accumulate in the blood when the functions of the liver are seriously interfered with, which marks it as a product of *excretion.*

It seems to me that enough has been said with regard to the function of the bile to convince the reader that this complex fluid has two important elements which have two separate functions.

First. *It contains the glyco-cholate and tauro-cholate of soda; which are not found in the blood, are manufactured in the liver, are discharged mainly at a certain stage of the digestive process, are destined to assist in some of the nutritive processes, are not discharged from the body, and, in fine, are products of secretion.*

Second. *It contains cholesterine; which is found in the blood, is merely separated from it by the liver, and not manufactured in this organ, is not destined to assist in any of the nutritive processes, but merely separated to be discharged from the body, and is a product of excretion.*

These two propositions, and more especially the second, being established, it becomes our task now to follow out the cholesterine after it has been discharged from the liver into the small intestine. If it be discharged from the body it must be by the rectum, and to complete the history of cholesterine we find it necessary to study the feces.

The Feces.—It is not my object to consider all the effete matters which go to make up the feces, though it must be acknowledged that our information on this subject is very limited. Following the cholesterine in its passage down the alimentary canal has opened a new subject for investigation, which it will be impossible to do entire justice to in this paper. There is a field for a long series of investigations into this part of our subject, which I hope to be able to cultivate to some extent in the future, and add something to the history of the substance we have been considering. At present I shall only endeavour to demonstrate the fact that cholesterine, in

a modified form, is discharged with the feces, and not attempt to treat of the conditions which modify the excretion of this substance (upon which as yet I have no data), which are of the last importance to the practical physician.

It is stated by some of the most reliable authors on physiology and physiological chemistry that cholesterine is found in the fecal matters. Robin and Verdeil say, "*Ce principe immédiat se trouve à l'état normal dans le sang, la bile, le foie, le cerveau, les nerfs, le crystallin et les matières fécales.*" Many other authors refer to it as found in the feces, and it was with that belief, that, in the experiments which form the basis of this article, I deferred my analyses of the feces till I had completed the observations on the blood, and then analyzed them, satisfied that I would find cholesterine, with the view to determine the variations, etc., in its quantity. When after a careful and prolonged examination of many specimens of feces I was unable to extract any cholesterine, I endeavoured to ascertain what observer had established its presence. Though it is mentioned by so many as present in the feces, I could find no mention of any one who had established this point; and in some of the analyses of Simon, I found that he had noted its absence in certain specimens of feces. I found also that Marcet, who published some elaborate analyses of the feces in the *Philosophical Transactions*, in 1854 and 1857, noted the absence of cholesterine in the normal feces of the human subject. We have already seen how conclusively the experiments on the blood from various parts of the system point to the excrementitious character of the cholesterine, showing us even in what part of the system it is found, and where it is eliminated; but it is undoubtedly one of the most important characters of an excretion that it should be discharged from the body, and I was unable for a time to convince myself that it was discharged. After evaporating the feces to dryness, pulverizing, extracting thoroughly with ether, decolorizing with animal charcoal, evaporating the ether and extracting the residue with boiling alcohol, I allowed the alcohol to evaporate, added a solution of caustic potash, and kept the mixture at a temperature near the boiling point for three and a quarter hours. The potash was then carefully washed away in a filter, the residue redissolved in ether and extracted with hot alcohol as before, and the alcoholic extract set aside to evaporate. A number of days passed without any signs of crystallization. The residue was, of course, non-saponifiable; but it differed from the cholesterine by being melted at a much lower temperature, though it presented the red colour with sulphuric acid which is said to be characteristic of the latter substance. It was examined carefully with the microscope daily, and after five or six days, to my great satisfaction, crystals began to form; but they were at first so indistinct that their form could not be clearly made out. These crystals, however, increased in size and number, and in a short time presented all the characteristics of *seroline*. In about ten days the whole mass had crystallized, making one of the most

superb exhibitions of crystals that could be imagined. The seroline crystallizes in the form of delicate transparent needles, which have a beauty under the microscope which could be but poorly imitated by the most delicate steel plate engraving. This substance, from its being found in such large quantity in the feces, I have spoken of as *stercorine.*

Before taking up the changes which the cholesterine undergoes in its passage down the alimentary canal, I will say a few words with regard to the stercorine, which will play an important part in this connection.

STERCORINE.

The stercorine has already been referred to and delineated in the analyses of various specimens of blood for cholesterine. It was discovered by Boudet, and described by him under the name of seroline, in an article published in the *Annales de Chimie et de Physique*, in 1833, as a principle found in the serum of the blood. Up to the present time, this is the only situation in which it has been found, and here in such an excessively minute quantity that enough has never been obtained for ultimate chemical analysis. With regard to its function nothing whatever has been known. Robin thus speaks of it: "*On ne sait pas comment se forme la séroline, ni quel est son rôle physiologique.*"[1]

Chemical characters.—This substance, like cholesterine, is a non-saponifiable fat. It has never been obtained in sufficient quantity for ultimate chemical analysis; but as in its decomposition it disengages a little ammonia, it is supposed by Verdeil and Marcet to contain nitrogen.[2] The evidences of this ingredient are very slight, and its existence is doubtful. It is neutral, inodorous, insoluble in water, soluble in ether, very soluble in hot alcohol, but almost insoluble in cold. It is not attacked by the caustic alkalies, even after prolonged boiling. When treated with strong sulphuric acid it strikes a red colour, similar to that produced by the sulphuric acid and cholesterine. According to Lehmann it melts at 96° 8′ Fahr., and on the application of strong heat may be distilled without change. Boudet extracted it from the serum of the blood, by evaporating it, boiling the residue with water, and evaporating again, taking up the residue with boiling alcohol, which deposited the crystals on cooling.

Form of its crystals.—Boudet describes the crystals thus obtained as filaments, with varicosities here and there, which gave them a beaded appearance. Lecanu also observed this peculiarity. In the atlas of Robin and Verdeil's *Anatomical Chemistry* we have a beautiful representation of the crystals of seroline from the blood. These observers have not noticed the beaded appearance mentioned by Boudet, but represent the crystals in

[1] Robin and Verdeil, Chimie Anatomique et Physiologique, tome iii. p. 66.

[2] Cours de Physiologie fait à la Faculté de Médecine de Paris. Par P. Bérard, Professeur de Physiologie, &c., tome iii. p. 118. Paris, 1851.

the form of delicate transparent needles, of variable size, some very small and others quite wide, terminating in a fine pointed extremity, which in some of the wider crystals is bifurcated, or even trifurcated, with the edges of the larger crystals frequently split, as it were, into delicate filaments. The smaller crystals frequently arrange themselves in a fan shape. Robin and Verdeil attribute the beaded appearance mentioned by Boudet and Lecanu to the presence of little globules of fatty matter mixed with the crystals. This seems probable, for we shall see when we examine the process of extraction employed by Boudet, that he probably did not succeed in obtaining it in a pure form. The appearance of these crystals has already been given in some of the diagrams of cholesterine, especially in Figs. 2, 6, 7, and 9. I have been able to follow the process of crystallization in the specimens extracted from the feces from its commencement, and have found that the splitting of the ends and edges of the crystals did not take place at first. The needles which were first found had regular borders and single pointed extremities; but after a few days they split up in the manner described and figured by Robin and Verdeil. (See Figs. 14 and 15.)

Situations.—Up to this time the seroline (or stercorine) has only been found in the serum of the blood, and there in but very small quantity, the proportion being, according to the analyses of Becquerel and Rodier, 0.020 to 0.025 of a part per 1,000 parts of blood. They have seen it mount up to 0.060 parts, and descend to a quantity almost inappreciable.[1]

Process of extraction.—In the first observations I made on the blood this substance was observed before the cholesterine. In these observations the blood was dried, pulverized, extracted with ether, the ether evaporated, the residue extracted with boiling alcohol, and then a solution of caustic potash added, which remained on the specimens for a number of days. In all the subsequent analyses of the blood the cholesterine was extracted perfectly pure, and *no stercorine whatever was observed.* The following was the difference in the modes of analysis. In the latter case the solution of potash was not allowed to remain on the specimens more than an hour or two; but was washed away, and the residue, which was left on the filter, redissolved in ether. The failure to detect the stercorine in all the later observations on the blood, which are twenty-four in number, inclines me to the opinion that it does not primarily exist in that fluid; and that when it has appeared in the extract it has been due to a transformation of a portion of the cholesterine. This view seems the more probable, as I have definitely ascertained by observations on the feces, which will be detailed farther on, that the cholesterine is capable of being changed into stercorine, and that this change actually takes place before it is discharged from the body. In my observations on the blood no attempt was made to get rid of this substance,

[1] Traité de Chimie Pathologique Appliquée à la Médecine Pratique. Par M. Alf. Becquerel and M. A. Rodier, p. 62. Paris, 1854.

and *though it is soluble in the menstrua which were used to extract the cholesterine, and not destroyed by any of the means that were employed to purify the cholesterine, it never appeared in the extract.* In these experiments the study of the stercorine in the blood has not been attempted; and though it is not possible to state at present how the cholesterine was transformed in the first observations, it seems most rational to suppose, in endeavouring to explain its absence in the twenty-four succeeding specimens of blood which were examined, that such a change had taken place.

I am inclined to the opinion, then, though I cannot state it positively, that the element under consideration does not exist in the blood as a proximate principle, but is formed from the cholesterine, in some unexplained way, by the processes which have been used for its extraction.[1] This transformation does not take place during the extraction of this substance from the feces, because I have in but a single instance been able to extract cholesterine by the processes which are successful in obtaining it in other situations in which it exists, including the meconium.

The stercorine may be extracted from the feces in the following way: The feces are evaporated to dryness, pulverized and treated with ether, which should be allowed to remain from twelve to twenty-four hours, protected from evaporation. The ether is then separated and decolorized by filtration through animal charcoal, fresh ether being added till the original quantity has passed through. It is impossible to decolorize the solution entirely, but it should be made to pass through of a very pale amber tinge and perfectly clear. The ether is then evaporated and the residue extracted with boiling alcohol. The alcohol is then evaporated and the residue treated with a solution of caustic potash, at a temperature a little below the boiling point, for from one to two hours. This dissolves all the saponifiable fats, and the solution is then largely diluted with water, thrown on a filter, and washed till the fluid which passes through is perfectly clear and neutral. The filter is then dried at a moderate temperature, and the residue washed out with ether, which is evaporated, extracted with boiling alcohol, and evaporated again. The residue is composed of pure stercorine.[2] The extract thus obtained is a clear, slightly amber, oily substance, of about the consistence of the ordinary Canada balsam used in microscopic preparations, and in four or five days begins to show the characteristic

[1] As we have no ultimate analysis of this substance, it is impossible to enter into any chemical speculations with regard to the change from cholesterine, as we may in the instance of the creatine and creatinine, or the urea and carbonate of ammonia.

[2] As this substance is said to be volatilized at a high temperature, it is important, in our examination, to avoid as much as possible the application of heat. Large quantities of it are extracted from the feces after evaporation over an ordinary water bath, but it might be better to evaporate the excrements at a lower temperature.

crystals. These are at first few in number; but soon the entire mass assumes a crystalline form. In a specimen which I have extracted from the feces I have 10.417 grains, consisting, apparently, of nothing but crystals. If the extract be evaporated in a very thin watch-glass it may be examined with the microscope daily, and the process of the formation of the crystals observed. These crystals, after they are fully formed, may be examined satisfactorily with a half or quarter inch objective.

History of seroline.—Very little is to be said with regard to the history of this substance. Boudet first described it in 1833.[1] Lecanu confirmed these observations in 1837.[2] Since then it has been studied by Becquerel and Rodier,[3] Chatin and Sandras,[4] W. Marcet and Verdeil.[5] Gobley states, in an article published in the *Journal de Chimie Médicale*, that the substance described by Boudet is not an immediate principle but a mixture of several substances, confounding it, however, with cholesterine.[6] Robin and Verdeil adopt this view, but consider it entirely different from the cholesterine.[7]

This element, existing, as it does, in large quantities in the fecal matter, must take its place among the important excrementitious substances discharged from the organism, not second in importance even to the urea. It is a curious fact that while the urea was known as an ingredient of the urine long before it could be demonstrated in the blood, taking its name from that fluid, we have the stercorine, an excrement of great importance, discovered in the blood and never till now recognized as an excrement and an ingredient of the feces, taking a name from the serum of the blood, which does not indicate at all its excrementitious properties nor the situation in which it is found in greatest abundance. As seroline has been heretofore a substance of very little prominence, and as it probably does not exist normally in the serum of the blood, and if at all, in insignificant quantity, the application seems a misnomer. We want a name which will indicate its excrementitious properties, and the channel by which it is evacuated, and I have adopted the name STERCORINE[8] as more appropriate and more suggestive of its properties, as it is undoubtedly the most important excrement discharged by the anus.

The questions which now arise with regard to this substance open a field of inquiry too extensive, by far, to be thoroughly investigated in the

[1] Boudet. Loc. cit.

[2] Lecanu. Études chim. sur le sang humain, thèse. Paris, 1837, page 55.

[3] Becquerel and Rodier. Recherches relatives à la comp. du sang. (Comptes Rendus. Paris, 144, tome xix. p. 1084.)

[4] Chatin et Sandras. Gaz. des hôpit., 1849, page 289.

[5] Bérard. Loc. cit.

[6] Gobley. Sur les matières grasses du sang. (Journal de Chimie Médicale, 1851. Paris, page 577.)

[7] Robin et Verdeil. Loc. cit.

[8] From *Stercus*, ŏris, dung.

time that could be devoted to this subject, or to be discussed in the limits of this paper. We wish to know the entire history of this product; the quantity discharged in twenty-four hours; variations that may take place with season, age, sex, diet, digestion, &c.; and more especially, the modifications which occur in its discharge in connection with diseased conditions. These points are of great importance, but require a long and laborious series of investigations for their elucidation. What has been done in a measure for the *urea* must be done for the *stercorine*, before we can arrive at a precise idea of its relations to disease. For this purpose a large number of quantitative analyses of healthy feces must be made and compared with similar analyses in different diseases. At present I have only instituted a sufficient number of examinations to substantiate the statements I have made with regard to the formation and discharge of this substance, and added a few examinations of feces in disease which bear upon the same points. I hope at some future time to go more fully into the study of the feces, and contribute something towards the elucidation of some of the questions which naturally arise. In the mean time I present the following observations on the stercorine as it appears in the feces.

Exp. 9. Seven and a half ounces of feces, perfectly normal in appearance, and being the entire quantity passed in the morning at the regular time for an evacuation, were taken from a healthy male, twenty-six years of age. After being evaporated, and pulverized finely in an agate mortar, the residue weighed 2 oz. 57.313 grains. A small quantity was then extracted with alcohol, the solution being of a yellow colour, and about six times its volume of ether added. The ether was filtered after standing for fifteen minutes, the filter washed with distilled water, and the solution tested with Pettenkoffer's test for the biliary salts. *None of these salts were present.*

A watery solution was then made of another portion, which was filtered and tested with nitric acid, but failed to show the reactions of the colouring matter of the bile.

The dry residue was then treated with five fluidounces of ether for twenty hours, when it was filtered through animal charcoal, fresh ether being added till the fluid which passed through made five ounces. It came through perfectly clear and of a very light golden tinge. It was then evaporated, leaving a golden yellow fat with a number of whitish resinous masses. It was then extracted with f℥iss of boiling alcohol, which removed everything but a small quantity of bright yellow oil, and filtered while hot. It became turbid on cooling, and was set aside to evaporate. Both the ethereal and alcoholic extracts had a very offensive rancid odour. The residue, after the evaporation of the alcohol, consisted of a considerable quantity of fat of a yellowish colour and a consistence like thick turpentine. It was then treated with a solution of caustic potash, kept near 212° for about thirty minutes and allowed to stand for twenty hours. At the end of that time a large quantity of fat floated on the top of the fluid not at all affected by the alkali. It was then largely diluted with distilled water filtered and washed, the filter dried, and the residue redissolved in ether. This ethereal solution was evaporated and the residue extracted with boiling alcohol as before. After the alcohol had evaporated, a small

quantity was treated with sulphuric acid which produced a peculiar red colour similar to that produced when the acid was added to a specimen of cholesterine, extracted from the blood and used for purposes of comparison.

Five days after, the specimen was examined with a $\frac{4}{10}$th inch objective, and *presented some crystals which looked like seroline;* but it was impossible, on account of the thickness of the glass capsule to apply a sufficiently high power to make this certain. Some long, pale, radiating crystals were observed, composition unknown, but they were not the crystals of excretine described by Marcet.[1] The specimen was treated again with a solution of caustic potash and kept at nearly the boiling point of water for three and a quarter hours, most of the fat floating on the top of the fluid in white flakes and yellow drops, but a considerable quantity undergoing saponification, as evidenced by the colour of the potash solution. The potash was then removed by filtration, the residue dissolved in ether and extracted with boiling alcohol as before.

Four days after the evaporation of the alcohol a large number of the characteristic crystals were formed. These did not have the split extremities and edges noted by Robin, but terminated in a single point, and had regular borders; these crystals are represented in Fig. 14.

In a few days the entire mass had assumed a crystalline form, and the crystals then presented split extremities and borders such as are mentioned by Robin. (See Fig. 15.)

The quantity of the stercorine was 10.417 grains.

Exp. 10. Another analysis was made of the feces from the same individual. During the experiment a large quantity was unfortunately lost, and the examination, therefore, was not quantitative. The presence of stercorine was established.

Exp. 11. The feces of the dog from which blood of the carotid and

[1] Marcet, in two papers published in the *Philosophical Transactions*, for 1854 and 1857, describes a new proximate principle in the feces which he calls Excretine. This he obtains in the following way: He first treats the feces with boiling alcohol till nothing more can be extracted. A sediment deposits from the alcohol on cooling. The alcoholic solution is acid. Milk of lime is added to the solution, which gives a yellowish brown precipitate, leaving a clear, straw-coloured fluid. The precipitate is then collected on a filter, dried, afterwards agitated with ether, and filtered, forming a clear yellow solution. In from one to three days beautiful silky crystals collect in masses, or tufts, adhering to the sides of the vessel, throwing out ramifications in every direction. These, viewed under the microscope, are in the form of acicular, four-sided prisms, and this substance is called by Dr. Marcet, Excretine, and is found nowhere but in the feces. It is soluble in ether and hot alcohol, sparingly so in cold alcohol, and insoluble in hot or cold water. It does not crystallize from an alcoholic solution on cooling, but crystallizes from ether. When suspended in boiling water it fuses into resinous masses, and floats on the top. Its fusing point is 203° to 205° Fahr. It may be boiled for hours with potash without undergoing saponification.

In the article published in 1857, Dr. Marcet gives the composition of the Excretine $C^{78} H^{78} O^{2} S^{1}$.

There is no similarity between the form of the substance described by Marcet and the stercorine. Its high fusing point, 203° to 205° Fahr., and its crystallization from an ethereal solution, also serve to distinguish it from the stercorine, which fuses at 96°.8 Fahr., and does not crystallize in an ethereal solution.

internal jugular on one side had been taken fifteen days before, the animal having entirely recovered, were examined. The analysis was not quantitative. The feces were treated in the way already described, and the presence of stercorine determined.

Exp. 12. A specimen of feces voided by a healthy dog, fasting, was examined in the usual way for stercorine. *After the final extract had evaporated, it was examined microscopically, and found to contain, in addition to the stercorine, a considerable quantity of cholesterine, crystallized in beautiful tablets. This is the only examination of feces in which I have found cholesterine.* The proportion of stercorine and cholesterine was as follows:—

Quantity of feces	137.513 grains.
Stercorine with a little cholesterine . . .	0.216 "

These examinations of the feces in health show that they invariably contain a non-saponifiable fatty substance known under the name of *seroline*, but which I have called *stercorine*. In but one of these analyses, the last, did I find any cholesterine, though the first were originally undertaken with a view to the extraction of this substance.

The stercorine has never before been detected in the feces, and, as far as my knowledge of its physiological properties is concerned, may be considered a new substance; the discovery of which, in this situation, marks it as one of the most important of the products of destructive assimilation. The next question which arises, then, is with regard to its origin.

Origin of the stercorine.—In our study of the chemical properties of this substance, we have already seen that it is one of the non-saponifiable fats, having many characters in common with the cholesterine. It has been described, under the name of seroline, as existing in the blood, in very minute quantity, but does not exist in any of the fluids which are poured into the alimentary canal. The cholesterine, however, which it so closely resembles, is one of the constituents of the bile. The fact that the cholesterine is discharged into the small intestine, and not usually found in the evacuations, while stercorine is abundant, would at once point to a possible connection between these two substances. In most cases, in health, cholesterine disappears, and stercorine is found; but in some rare instances, as in the single examination of dogs' feces, Exp. 12, the two substances coexist in the evacuations, the stercorine, in the example just mentioned, in much the greater quantity. The question then arises: Is the cholesterine capable of being converted into stercorine, and does the latter substance originate from a transformation of the cholesterine of the bile? Before we treat of this subject experimentally, let us examine the facts which we already have bearing on this point. No examinations of the feces have ever been made for *stercorine*, but under certain circumstances *cholesterine* has been found discharged by the anus without alteration.

Cholesterine has been detected in the meconium, in the feces of hibernating animals, and occasionally in ordinary feces, though I can find no observation of this kind but the one just recorded.

Meconium.—Cholesterine exists in the meconium in considerable quantity, where it may be seen in tablets by a simple microscopic examination, and from which it may be extracted in quantity, and with great facility. The stercorine, or seroline, has never been mentioned as existing in this situation. In the single examination I have made of the meconium I found an abundance of cholesterine, 6.245 parts per 1,000, but no stercorine. There is no difficulty in explaining the origin of the cholesterine in the meconium. Long before any food is taken into the alimentary canal, and before the exclusively digestive fluids are formed, the bile is formed and discharged. It accumulates in the intestine, with other matters constituting the meconium, and is finally evacuated soon after birth. Hence the cholesterine exists in large abundance; but when the digestive fluids are secreted, and food is received into the alimentary canal, the cholesterine is lost and the stercorine makes its appearance.

Feces of hibernating animals.—As the excreting function of the liver commences before food is taken into the alimentary canal, so it goes on during the state of hibernation, when the animal takes no food for weeks, or even months. Under these circumstances, the cholesterine is found unchanged in the feces, but it disappears when the animal arouses, and the digestive organs resume their functions.

Normal feces.—In the normal feces the cholesterine is generally absent; but in Exp. 12, it was found in small quantity, mixed with stercorine. This animal had been certainly twenty-four hours, and probably forty-eight hours, without food. The feces were of normal colour and consistence.

These facts seem to show that before digestion commences, as in the fœtus, and when it is suspended, as in hibernating animals and in Exp. 12, cholesterine passes through the alimentary canal unchanged. But as soon as digestion commences, the cholesterine is lost in the feces, and its place is supplied by stercorine. It seems almost certain, then, that in its passage down the alimentary canal, the cholesterine of the bile is acted upon by some of the digestive fluids and changed into stercorine. This change seems to be incident to the digestive act; for before digestion commences, or when it is suspended, the cholesterine passes through unchanged. A conclusive observation would be to cut off the bile from the intestines, and consequently the cholesterine, and notice the effect upon the production of stercorine. In a case of jaundice from duodenitis (which will be more minutely detailed in the section on the pathological relations of cholesterine), the necessary conditions for this observation seemed to be fulfilled. The patient suffered from intense jaundice, dependent upon obstruction of the common bile duct from duodenitis. The feces were clay-coloured. After a time, the patient was relieved of the jaundice, and the feces regained their natural colour. While the feces were decolorized, and when the icterus was most marked, it is probable that the bile was entirely cut off from the alimentary canal. This condition was relieved, however, when

the feces regained their colour, and the icterus disappeared. For the purpose of ascertaining the effect of the obstruction to the flow of bile on the stercorine in the feces, and of the re-establishment of the flow, the stools were examined chemically during the jaundice, and after the patient had recovered.

Analysis of decolorized feces.—The quantity of feces examined was 941.4 grains. After evaporation, extraction with ether, and extraction of the residue left after the evaporation of the ether, with hot alcohol, the fat, which was very abundant, was entirely saponified by boiling for fifteen minutes with a solution of caustic potash, *showing that neither cholesterine nor stercorine was present.*

Analysis of feces from the same patient after they had become normal in colour.—This analysis was made nineteen days after the preceding one. The quantity of feces was small. The specimen was treated in the usual way, showing stercorine in the following proportions:—

Quantity of feces	502. grains.
" stercorine	0.34 "

Taken in connection with the facts which have already been cited with regard to the discharge of cholesterine by the anus, when digestion is not going on, this observation establishes the origin of the stercorine. *It is produced by a transformation, connected with the digestive act, of the cholesterine of the bile.* When the cholesterine does not find its way into the alimentary canal, as was the case in the first analysis of feces, stercorine is not found in the dejections; when the discharge is re-established, the stercorine reappears.

Comparison of the daily quantity of stercorine discharged, with the quantity of cholesterine produced by the liver.—The quantity of stercorine which I extracted from the regular daily feces of an adult healthy male, was 10.417 grains. As there is no cholesterine found in the dejections, this should represent the entire quantity of cholesterine excreted in the twenty-four hours. A comparison of this quantity with the estimated quantity of cholesterine discharged in the day, shows this to be the case.

Quantity of bile in the twenty-four hours (Dalton) .	16.940 grains.[1]
" " cholesterine at 0.618 pts. per 1,000 (A. Flint, Jr.)	10.469[2] "
" " stercorine discharged (*Id.*) . . .	10.417 "
Difference . .	.052

This insignificant difference of .052 of a grain, at once proves the correctness of the estimate of the daily quantity of bile excreted, the accuracy of the estimate of the proportion of cholesterine in the bile, and of the quantitative analysis for the stercorine; and made, as the three observations were, with-

[1] Dalton's Treatise on Human Physiology, 2d edition, page 171.

[2] See table, page 362.

out the slightest reference to each other, adds the final link to the chain of evidence in support of the view that *the cholesterine, in its passage down the alimentary canal, is converted into stercorine, in which form it is discharged in the feces.*

The history of the cholesterine thus resolves itself:—

1. *Cholesterine is an effete material, produced by the destructive assimilation of nervous matters, and absorbed by the blood.*

2. *It is separated from the blood in its passage through the liver, enters into the composition of the bile, giving this fluid its excrementitious character.*

3. *It is poured with the bile into the upper part of the small intestine, when the process of digestion induces a change into stercorine; in which form it is discharged by the feces.*

4. *Stercorine, the great excrementitious element of the feces, is one of the most important excrements produced by the waste of the system.*

PATHOLOGICAL RELATIONS OF CHOLESTERINE.—With the limited data we have on the subject of the variations in the quantity of cholesterine in health and disease, it is impossible to do more than merely to open the great subject of its pathological relations. To a certain extent, all questions in physiology have for an end the elucidation of points in pathology. The practical physician, who may be the reader of this article, will naturally inquire if the more definite views which we are now enabled to hold with regard to the function of the bile be of any use to him in the study and treatment of disease. It is certain that no addition to our knowledge of the functions of the healthy body is without its bearings on disease, immediate or remote. What may seem to be simply a matter of interest to the pure physiologist, without apparently any practical bearing, is sure at some time to be so connected, perhaps, with other advances, as to be useful to the practitioner. But the pathological relations of an important excretion do not have a practical interest so remote, especially when this function is connected with the liver. Almost from time immemorial, a large number of diseases have been referred to derangement of the liver, and in their treatment, it has been thought of immense importance to promote the secretion of the bile. A certain class of remedies supposed to regulate the function of the bile, has been constantly employed by physicians. At the present day, these ideas have fallen somewhat into disrepute; for the enlightened physician is now accustomed to base his pathological views upon a certain amount of definite knowledge, and it has been found that both the physiology and the pathology of the bile have been very little understood. The older practitioners had, as we have now, a certain class of cases characterized by a general *malaise*, and having indefinite symptoms which were attributed to "biliousness," in which they were in the habit of employing the

cholagogues, with mercury at the head, with undoubted success. It is true that, as our knowledge of disease becomes more accurate, the conditions which were supposed to indicate "biliousness," have become referred to other disorders; but no great advance has been made in the pathology of the liver, and there are yet many conditions which may be successfully —though empirically—treated, the true character of which is unknown. It is on this obscure subject that it is hoped the preceding physiological investigations will throw some light. To repeat an illustration made use of before, a knowledge of the functions of cholesterine, and its history in the healthy organism, should contribute as much to the pathology of diseases dependent on derangement of this function, as has the development of the functions of the urea for diseases now known to be dependent or uremia.

Cholesteremia.

In common with other excrementitious substances, which invariably exist in the blood in health, if the function of the eliminating organ be interfered with, accumulation takes place in the blood. This fact has already been incidentally referred to in treating of the properties of the cholesterine which allied it to effete substances. It takes place with the urea; but cases of uremic poisoning occurred, and patients died in uremic coma, long before the cause of it was understood. It is the same with the bile. Ordinary cases of jaundice, which have been called, by Piorry, cholemia, are not of a dangerous character; but there are cases in which jaundice, though less marked as regards colour, is a very different condition. Here we have evidently the operation of some poison in the blood, and coma and death from its effects on the brain, follow as in retention of the urea. Pathologists inquire why there is this difference in the severity of cases of icterus? Chemists have analyzed the blood in the hope of explaining it by the presence of the glyco-cholates and tauro-cholates of soda in the grave cases, regarding them as the only important constituents of the bile. But their failure to detect these substances has left the question still unanswered.

In simple cases of jaundice we have a resorption of the colouring matter of the bile from the excretory passages.

In grave cases of jaundice, which almost invariably terminate fatally, we have a retention of the cholesterine in the blood, or cholesteremia.

I have been forced to make use of cases of disease exclusively in studying this condition, for no one has yet been able, in the larger animals, to extirpate the liver, as we do the kidneys, notice the symptoms of poisoning, and demonstrate the accumulation of cholesterine in the blood. Nor have I yet been able, on account of the insolubility of the cholesterine, to make experiments by injecting it into the circulation. I had, however, an opportunity of making an examination of the blood of a patient in the last stages of

cirrhosis of the liver, accompanied with jaundice, and compare it with an examination of the blood of a patient suffering from simple icterus. Both of these patients had decoloration of the feces; but in the first, the icterus was a grave symptom, accompanying the last stages of the disorganization of the liver; while in the latter, it was simply dependent on duodenitis, the prognosis was favourable, and verified by the result. As icterus accompanying jaundice is of very infrequent occurrence, I deemed myself very fortunate in having an opportunity of comparing the two cases.

Case I. *Jaundice dependent on obstruction from duodenitis.*—Mary Bishop, æt. 42, native of Ireland, widow, occupation servant, was admitted into the Blackwell's Island Hospital, June 12, 1862, with the following symptoms: Slight febrile movement, with severe pain over the duodenum; the surface of the body was highly icterosed; the stools were clay-coloured; urine high-coloured, but not examined for bile; lungs and heart normal; appetite rather poor; no ascites. The icterus had existed since about May 23, 1862. The patient was confined to the bed.

Dr. Flint, the attending physician, pronounced it a case of icterus dependent on duodenitis.

Treatment.—Laxatives daily, with good diet and a moderate amount of stimulus.

June 21. A small quantity of blood was drawn from the arm for examination, and *June* 23, the feces were collected for the same purpose.

June 27. The patient remains about the same.

July 11. All pain and tenderness over the duodenum have disappeared. She has steadily improved since the last record. The stools have been natural for several days. Though confined to the bed most of the time, she is able to sit up two or three hours daily. The jaundice has been gradually diminishing, and three or four days ago it had entirely disappeared, and is now absent.

July 12. Another specimen of the feces, which was of normal appearance, was taken for examination.

Analysis of the blood for cholesterine.—The blood was examined about sixteen hours after it was taken from the arm. It had entirely separated into serum and clot. The serum was of a bright yellow colour—more markedly bilious than in the succeeding case. It was evaporated, pulverized, and a quantitative analysis for cholesterine made, with the following results:—

Quantity of blood	212.428 grains.
Quantity of cholesterine	0.108 "
Proportion of cholesterine per 1,000 pts. of blood .	0.508 "

Case II. *Jaundice with cirrhosis.*—Ann Thompson, æt. 39, native of Ireland, occupation servant, was admitted into the Blackwell's Island Hospital June 16, 1862, and gave the following history:—

Three months ago she contracted a severe cold, which was accompanied with swelling of the left hand and of both legs, continuing for eight or nine weeks. At the end of that time, she noticed that the abdomen was increasing in size. She was then very weak, the urine was scanty, bowels regular up to the time when she entered the hospital. She denied having been in the habit of drinking spirit, but acknowledged that she drank beer.

June 18. The surface of the body was very much icterosed, the colour

being very marked under the tongue and in the conjunctiva; the abdomen was full of fluid; pulse 90, small and weak; bowels loose, and the dejections clay-coloured; the urine highly tinged with bile and copious; appetite very poor. She was tapped, and about eight quarts of clear, straw-coloured serum were evacuated. The patient was confined to the bed.

Dr. Flint, the attending physician, diagnosticated cirrhosis.

The treatment consisted of sustaining measures, with stimulants, and the tinct. ferri muriat.

June 21. A small quantity of blood was taken from the arm for examination, and *June* 23, a specimen of the feces was obtained for the same purpose.

The patient died June 27. There were no convulsions, and she was sensible, though in a state of stupor, up to twenty minutes before the fatal termination. The stupor existed three or four days before death. Two days before, she complained of double vision. The icterus was excessive up to the time of her death.

Autopsy.—The abdomen contained about twelve quarts of fluid. The liver was examined; its weight was 3 lbs. 12½ oz. It was very light-coloured, and had something of the "hob-nail" appearance; presenting, in short, the gross characters of cirrhosis. The gall-bladder was very much contracted, and contained only about two drachms of bile. Microscopic examination of the organ showed the liver-cells shrunken. The fibrous substance was increased in quantity, and there were present a large number of rather angular globules of fat.

Analysis of the blood for cholesterine.—The blood was examined about sixteen hours after it was drawn. It had fully separated into serum and clot, and the serum was of a greenish, yellow color. The whole, serum and clot, was then evaporated, pulverized, and a quantitative analysis made for cholesterine in the manner already indicated, with the following results:—

Quantity of blood	50.776 grains.
Quantity of cholesterine	0.093 "
Proportion of cholesterine per 1,000 pts. . . .	1.850 "

The following table gives a comparison of these results with those obtained in the analyses of the three specimens of healthy blood from the arm, which were examined at the same time, and all five specimens subjected to identical processes.

Table of Quantity of Cholesterine in Healthy Blood, Blood from Simple Jaundice, and Jaundice with Cirrhosis.

HEALTHY BLOOD.	Cholesterine per 1,000 pts.	BLOOD OF JAUNDICE.	Cholesterine per 1,000 pts.
Male, æt. 35	0.445	CASE I. Simple Jaundice .	0.508
" " 22	0.658	" II. Jaundice with Cirrhosis . . .	1.850
" " 24	0.751		

CASE I. Simple Jaundice.	Percentage of increase over minimum of healthy blood . .	14.157
	Decrease below maximum .	32.357
CASE II. Jaundice with Cirrhosis.	Increase over minimum .	315.730
	Increase over maximum .	146.338

The results of the examination of the blood in these cases of disease are very striking and instructive. We have already seen that the variations in health are very considerable. In the three analyses here noted, the maximum was 0.751, and the minimum 0.445 pts. per 1,000. The conditions which regulate this variation it has not yet been possible to study; but we know enough with regard to it to see that in the examination of blood in disease, the cholesterine must mount considerably above the maximum, or fall much below the minimum, to be considered beyond the limits of health. But in the second specimen of jaundiced blood, the variation from the limits of health is so considerable as to enable us to draw very important physiological and pathological conclusions.

In the first place, what is the bearing of these observations on the *physiology* of cholesterine? As before remarked, no one has been able to remove the liver from a living animal, and notice the effect upon the quantity of cholesterine in the blood.[1] This experiment, if it were possible, and if it showed that the cholesterine increased in quantity, and killed the animal, would be positive proof that it was an excrementitious substance, and that it was removed by the liver. But while the experimental physiologist contributes much to the information of the pathologist by artificially producing abnormal conditions, pathology furnishes a multitude of useful experiments of Nature, if we may so term them, which are invaluable to the physiologist. In the present instance, cases of disease of the liver present a condition which we are not at present able to imitate by experiments on the lower animals. Disorganizing disease of the liver must interfere with its excretory function, as Bright's disease does with the elimination of urea; and if cholesterine be an excrementitious substance to be removed by the liver, when the liver is seriously affected with structural disease, we will have an accumulation of it in the blood. *This, if fully established, is positive proof of the character of cholesterine and the function of the liver connected with its elimination.*

What do we learn then by a comparison of the blood in Case II. of jaundice dependent on cirrhosis, with healthy blood and a study of the history of the case?

The cholesterine, in this instance, is enormously increased in quantity, 315.730 per cent. over the minimum, and 146.338 per cent. over the maximum. The case, as far as symptoms are concerned, was of a very grave character. The patient not only suffered from an accumulation of fluid, but there was evidently a poison in the system. The patient died after

[1] Müller, Kunde, and Moleschott, have succeeded in extirpating the liver from frogs, and keeping them alive for two or three days—Moleschott preserving them for several weeks. These observations were made with reference to the accumulation of the biliary salts, and of the bile pigment in the blood, their attention not having been directed to cholesterine. A series of experiments on frogs was commenced by the writer, but they promised to be so prolonged that they were deferred.

three or four days of stupor, and, on post-mortem examination, the liver was found disorganized. There was a deficient secretion of bile, and had been for a long time, for the gall-bladder was very much contracted, and the stools were clay-coloured. In short the patient died of *cholesteremia;* and the fact that this condition can exist is a proof of the excrementitious function of the cholesterine, as uremia, as a toxemic condition, presupposes that urea is an excrement.

Physiologically this case fulfils the essential condition of excrementitious substances; namely, accumulation in the blood when the eliminating functions of the excretory organs are interfered with. The liver became so disorganized that its functions were seriously embarrassed, and the quantity of cholesterine in the blood increased to an enormous extent.

The *pathological* deductions from the facts which have been elicited by the examination of the blood in these cases seem to me of great importance. The literature of diseases connected with disorders of the liver is full of theories, more or less plausible, to explain certain conditions which have long been established by clinical observation. We have cases of simple jaundice which are not dangerous to life, and sometimes, though the icterus be excessive, run a certain course without even interfering with the ordinary avocations of the patient. Again, we have jaundice which is invariably fatal. That disease described by Frerichs under the name of acute atrophy of the liver, and called by some acute jaundice, is one of the most serious diseases of which we have any knowledge. The existence of this great difference has led clinical observers to attribute the mild cases to simple resorption of the *colouring* matter of the bile, and the severe cases to a retention or resorption of some of its more important constituents; especially as it has also been observed that the symptoms which characterize the latter condition occasionally occur in structural diseases of the liver without any discoloration of the skin. But the pathology of this disease has been entirely unknown. It has been thought that in such cases some of the elements of the bile should exist in the blood. Frerichs says: "In the same way that urea accumulates in large quantity in the blood in granular degeneration of the kidneys, so ought the biliary acids and bile-pigment to accumulate in the blood in cases of granular liver. Repeated observations have proved that this is not the case."[1] Experiments on animals have been followed with like results. The frogs that were kept alive by Moleschott for weeks after the removal of the liver did not present a trace of any of the biliary salts or pigment in any part of the system, showing that these matters are manufactured in the liver. This obscurity, which leads to all sorts of theories with regard to liver pathology, must exist as long as our knowledge of the physiology of the bile is so indefinite. If ob-

[1] A Clinical Treatise on Diseases of the Liver, by Dr. Fried. Theod. Frerichs, Prof. of Clinical Medicine, &c., Berlin. Translated by Charles Murchison, M. D. The New Sydenham Society, London, 1860, vol. i. p. 83.

servers had looked for cholesterine—a substance which pre-exists in the blood and is separated by the liver—instead of the biliary salts—which do not pre-exist in the blood, are manufactured in the liver, as these experiments tended to show, and are peculiar to the bile—they would have met with different results. The very fact that the biliary salts are peculiar to the bile, and found in no other fluid, should have led them to disregard this substance in their analyses of the blood, because this stamps it as a secretion and distinguishes it from the excretions; they should have looked for some substance which exists in the blood as well as the bile, an indispensable condition of an excretion, and this substance is the cholesterine.

Understanding, as we now do, the physiological relations of the cholesterine, we may divide jaundice into two varieties: simple *Icterus*, or yellowness, and a condition which I have called *Cholesteremia.* We may have, also, the latter condition unaccompanied by discoloration of the skin.

Simple icterus.—In simple icterus we have a resorption of the colouring matter from the biliary passages. As it has been proven that the colouring matter of the bile appears first in the liver, when it exists in the blood, it is not due to accumulation, but to resorption. In these cases the resorption is generally dependent on obstruction from some cause, by means of which the bile is confined. The patient suffers only from the disease which causes the obstruction, and from the derangement of digestion which is due to the absence of bile in the intestinal canal. In those cases, in which we have no organic lesion of the liver, there is no danger of absorption of the cholesterine. We have a condition which is analogous to retention of urine. The patient suffers simply from retention of bile in the excretory passages, and cholesteremia is no more to be expected from obstruction of the bile duct without structural changes of the liver, than uremia is to be looked for in vesical retention of urine without organic change in the kidneys. Excrements are not reabsorbed, though they may be retained in the blood.

The quantity of cholesterine in the blood is not necessarily increased in simple icterus, for the liver is still performing its function of eliminating it, and when once separated from the blood it is not taken up again. The analysis of the blood in Case I. indicated a proportion of 0.508 parts per 1,000, which is within the limits of health; a little below the mean, probably on account of the somewhat enfeebled condition of the patient.

The feces may or may not be decolorized, this depending on the extent of the obstruction to the passage of bile into the intestine. The obstruction to the flow of bile is frequently removed before the system has time to remove the coloration of the skin, and the feces become normal while the patient is icterosed. In some instances there is no change in the appearance of the dejections during the course of the disease. When the dejections are entirely decolorized there is an absence of the *stercorine*, into which the cholesterine is transformed before it is discharged, with an ab-

normal quantity of fat which has passed through undigested.[1] This element reappears in the feces when the flow of bile is re-established and they assume their normal colour.

The two following analyses were made of the feces in Case I.; one, when they were entirely decolorized, and the patient was very much icterosed, and the other, when she had recovered, and the dejections had assumed their natural appearance.

Feces of Case I. Jaundice dependent on duodenitis. First analysis.—The feces were clay-coloured, and apparently destitute of bile. They weighed 941.4 grains. They were evaporated to dryness without difficulty, pulverized, digested with f℥iij of ether for twenty hours, filtered through animal charcoal, evaporated and extracted with hot alcohol. The fatty residue after evaporation of the alcohol was very abundant.

The residue was then treated with a solution of caustic potash and exposed to a gentle heat. In fifteen minutes it became entirely saponified, forming a clear homogeneous soap with no residue, showing the entire absence of stercorine. The soap was boiled down and moulded into a cake, which I preserved and which weighs 34 grains. The following are the results of the examination:—

Quantity of feces	941.4 grains.
" fat	39.124 "
Percentage of fat	4.144

No stercorine or other non-saponifiable fats.

Feces nineteen days after. Second analysis.—At that time the patient had entirely recovered from the jaundice, and the feces had regained their natural appearance. A small specimen was taken for chemical examination, which was done, employing the process already described for the extraction of stercorine, with the following results:—

Quantity of feces	503. grains.
" stercorine	0.340 "

Cholesteremia with icterus.—In jaundice complicated with blood poisoning we have a very different state of things as regards gravity of symptoms and prognosis. This occurs in acute jaundice, or when it accompanies, and is dependent upon, structural change in the liver, as the jaundice of cirrhosis. The difference in the pathology of these cases, compared with those of simple icterus, has long been recognized; but, as before remarked, analysis of the blood has failed to throw any light on the subject, because chemists directed their attention exclusively to the biliary salts. Frerichs says:—

"I have myself repeatedly examined jaundiced blood, which has been obtained by venesection, or still more frequently, from the heart or venæ cavæ of the dead body, for the biliary acids, and their immediate derivatives; and more recently I have had it examined by my assistant, Dr. Valentin, but always with negative results. No substance could be found in the alcoholic extract of the

[1] This fact, which has often been remarked, seems to indicate that the bile is actively concerned in the digestion of the fats. I have noticed that dogs with biliary fistulæ, though with a ravenous appetite, refuse to eat fat meat. This disinclination to eat fat has been noticed in cases of jaundice with decoloration of the feces.

blood which yielded any indication, by Pettenkoffer's test for the biliary acids, whether this alcoholic extract was treated directly with sulphuric acid and sugar, or whether, in order to get rid of foreign substances, a watery extract of it was first prepared. This coincides with the experience of most of the older observers."[1]

In cases of blood poisoning by retention and accumulation of elements of the bile in the blood, we have, as the important pathological condition, the great increase in the quantity of cholesterine. The fact of accumulation of this substance in the blood in certain cases of icterus, has been noticed by Becquerel and Rodier; but they do not connect it with structural change in the liver, and do not explain its physiological or pathological importance. The fact of its accumulation in the blood is strong evidence of its excrementitious function, but this does not appear to have attracted the attention of the observers just mentioned. The following is one of the cases in which increase of the cholesterine was observed by them, the only one in which they allude to its significance, and here merely to state their inability to explain it:—

"The second case is nearly similar, excepting the phlegmasia, which did not exist. It relates to a boy, nineteen years of age, a *limonadier*, affected for some time with a bilious diarrhœa, with fever, and icterus, recently developed and very marked. There existed in the blood of this patient a slight diminution of the globules (136); albumen in normal quantity (71.4); likewise fibrin (2.3); fatty matter sufficiently abundant; seroline in an imponderable quantity; cholesterine excessively abundant (0.798); soaps abundant (2.032). *To what cause must we attribute this great quantity of cholesterine? How and why is it concentrated in the blood in spite of the biliary flux? This is what it is difficult to decide.*"[2]

The acquaintance we now have with the physiology of cholesterine removes the difficulty in the explanation of this fact. In Case II. we had the rare complication of jaundice with cirrhosis, the symptoms evidently pointing to poisoning by retention of some noxious element in the blood. Examination of the blood in this case showed that the cholesterine existed in the proportion of 1.850 parts per 1,000; the minimum of healthy blood being 0.445 and the maximum 0.751 parts. Taking this case as an example, we have cholesteremia with jaundice presenting symptoms which characterize the retention of bile in the blood, which are already well known, and were established long before we were able to say what element was retained. Cases in which jaundice exists with cholesteremia are so different from cases of ordinary jaundice that there is no difficulty in making the discrimination by symptoms. When jaundice exists with cirrhosis, it is probable that we always have cholesteremia. In acute jaundice the symptoms, especially those referable to the nervous system, are so marked that the gravity of the case is easily recognized. I have no doubt but in such cases the cholesterine is immensely increased in the blood, though on account of their rarity I have not had an opportunity of determining this by

[1] Frerichs, op. cit., page 95.

[2] Translated from Becquerel and Rodier, op. cit., page 210. The Italics are my own.

analysis. Icterus with cholesteremia and simple icterus are as distinct from each other as possible. The only feature they have in common is the discoloration of the skin. The simple icterus, which is comparatively harmless, is not liable to run into the more severe variety, which cannot occur without structural change in the liver; while the grave variety occurs when we have evidence of organic lesion of the liver, or presents symptoms from the first which indicate its serious character. The one has no more constitutional danger than exists in a simple case of spasmodic retention of urine, while the other has characters as grave as those which accompany uremic poisoning from disorganization of the kidney.

In these cases the feces may show a very marked deficiency of bile, but this is due to the deficient, but not arrested, secretion of this fluid, while the clay-coloured stools in simple icterus are dependent on the want of discharge of the bile into the intestine. While in the latter instance, as in Case I., we would expect to find an absence of stercorine in the dejections, in the former we would expect to find it, though in greatly diminished quantity. Further examination of the feces in cases of structural disease of the liver will be of immense advantage as indicating, by the quantity of stercorine found, the extent to which the eliminative function of the liver is interfered with.

The following analysis was made of the feces in Case II. of jaundice dependent on cirrhosis.

Feces of Case II. Jaundice dependent on cirrhosis.—The feces were clay-coloured, though it was not quite as marked as in the Case I. of simple jaundice.

The specimen was evaporated with great difficulty. It came down to a black glutinous mass which could not be pulverized. It was treated twice with alcohol, the alcohol evaporated, and once with ether. After the ether had evaporated it was pulverized and analyzed for stercorine, with the following results:—

Quantity of feces	272.1 grains.
Stercorine	0.077 "

In this analysis we have a very great diminution of the stercorine in the feces, the normal quantity in the daily passages, according to the single examination I have made, being 10.417 grains. The specimen was the ordinary amount passed daily. It showed that the cholesterine was still eliminated, though not with sufficient activity to prevent its accumulation in the system. This was further evidenced by the post-mortem examination, when the gall-bladder was found contracted, but containing a small quantity of bile.

Examination of the blood and feces of the patient suffering under cholesteremia with jaundice, thus leads to the following conclusions:—

1. *The cholesterine is enormously increased in the blood, showing that the structural change in the liver has interfered with its removal from that fluid.*

2. *The stercorine is correspondingly diminished in the feces, showing that the cholesterine is not discharged in normal quantity into the alimentary canal.*

Cholesteremia without icterus.—In a practical point of view, this condition becomes one which it is very important to be able to recognize; but it is here that we feel most the necessity of more extended investigations than it has been possible to make. I have been enabled only to open the subject by the analysis of one or two specimens of blood taken from patients who had organic change in the liver, but no jaundice. One of the most familiar of these affections of the liver consists in those changes of structure which are included in the term cirrhosis. It is very unusual to find this associated with jaundice, and we have already seen how serious this symptom is. Frerichs describes a condition which he calls *acholia*, denoting suppression of the functions of the liver. This is the same condition which I have called *cholesteremia*, which expresses the element of the bile which produces the toxic effects, the action of which was unknown to Frerichs, while the term acholia expresses retention of bile without giving us any idea of the active morbific agent. Further investigation will, undoubtedly, establish more fully what the analyses I have made thus far seem to show, namely, that in what Frerichs calls acholia without jaundice, we have the cholesteremic condition we have seen to exist in acholia with jaundice. The following quotation from Frerichs' admirable treatise on the liver, gives an idea of one of the conditions in which we have acholia (or cholesteremia) with or without jaundice.[1]

> "Cases have repeatedly occurred to me, in which individuals who for a long period have suffered from cirrhosis of the liver, have suddenly presented a series of symptoms which are foreign to that disease. They have become unconscious, and have been afterwards seized with noisy delirium, from which they passed to deep coma, and in this state have died. In one case there was spasmodic contraction of the muscles of the left side of the face. In most cases, slight jaundice made its appearance at the same time, and in one instance there were petechiæ. Upon *post-mortem* examination, not the slightest lesion could be detected in the brain, neither were there indications of any acute disease which could account for the derangement of the cerebral functions. The liver, in all cases, presented cirrhotic degeneration in a marked degree, and the glandular cells were for the most part loaded with fat; large quantities of leucine separating from it; the bile ducts contained only a small quantity of pale bile."

In certain cases of organic lesion of the liver, and probably in all cases accompanied by the grave symptoms mentioned by Frerichs, we have cholesteremia; but this character does not exist in all cases where the liver is affected, any more than uremia exists in all cases of structural disease of the kidney. Nature not only provides organs which are sufficient for the removal of effete matters from the blood, but provides for conditions in which the function of these organs may be partly interrupted, and yet the excretion go on, a part taking on the function of the whole. One of the kidneys may be removed, and yet the other, increased in size it is true, is

[1] Frerichs, op. cit., page 241.

capable of performing the function of both. The kidneys may be partially disorganized, and yet the sound portion be sufficient for the depurative function, and urea will not accumulate in the blood. So it is with the liver. We see patients with partial disintegration of this organ, as in some cases of cirrhosis, suffering apparently but little inconvenience from the disease, and presenting none of the symptoms of cholesteremia. But when the liver is extensively affected, so much so that it cannot separate the cholesterine effectually from the blood, we have the condition of cholesteremia. I have made an analysis of the blood of two patients affected with cirrhosis, who presented this contrast as regards the symptoms of cholesteremia. In one of them, Case III., there was considerable constitutional disturbance; and in the other, Case IV., the patient was about, and suffered no great inconvenience, though he had been tapped for ascites about thirty times.

Case III. *Cirrhosis with ascites, and considerable affection of the general health.*—Mary Perkins, æt. 23, native of Ireland, prostitute, has been a spirit-drinker for about seven years, about the first of May, 1862, noticed an enlargement of the abdomen, which was accompanied with pain over the region of the liver, when she took to the bed. She states that at that time the stools were dark green. Fluid continued to accumulate in the abdomen, and was drawn off in the hospital (Blackwell's Island), June 25. About six quarts of a clear, straw-coloured serum were removed, but a little was left in the abdomen, as the patient was very weak. The patient improved after the removal of the fluid, which did not reaccumulate in any considerable quantity. The liver was found diminished in size, and from this and other circumstances, the diagnosis was cirrhosis.

June 28. A specimen of blood was taken from the arm for examination. She left the hospital July 6, and was confined to the bed till within a few days of her discharge.

Analysis of the blood for cholesterine.—The blood presented nothing peculiar in its appearance. A quantitative analysis was made for cholesterine, with the following results:—

Quantity of blood	117.193 grains.
" " cholesterine	0.108 "
Proportion of cholesterine per 1,000 parts of blood .	0.922 "

Case IV. *Cirrhosis with ascites, and slight constitutional disturbance.*—Thomas Hughes, æt. about 33, brewer, presented himself at the Long Island College Hospital, July 1, 1862, with Dr. Dugan, of Williamsburg. He confesses to have been in the habit of drinking more or less spirit daily for the past ten years. The abdomen began to swell about eighteen months ago. The ascites was preceded by hæmatemesis, when he vomited an abundance of black, clotted blood. The belly immediately began to swell, and enlarged rapidly. He took hydragogues under the direction of a physician, and the dropsy disappeared, but returned whenever the medicines were discontinued. Œdema of the lower limbs occurred soon after the ascites commenced. He has had recurrence of hæmatemesis twice since the first attack.

He was first tapped two or three months after the affection occurred, and has been tapped about thirty times since. Was tapped last on the 27th

ult. *He is tapped and goes out the next day. He thinks nothing of it, and is always for the time relieved.* He has continued to drink beer daily and some spirit. After tapping his appetite is good, and food occasions no inconvenience. When he is full, food occasions a distressing distension, so that he does not eat freely.

Urine is scanty when the abdomen is full, and free, after tapping.

There is no pain in the belly, or elsewhere. He is about all day, but is not engaged in business. He says he is not very feeble. He presents a notably anæmic aspect.

The abdomen is now moderately full (July 1.) Superficial veins of abdomen much enlarged. Heart appears not enlarged; a feeble systolic murmur over the body of the organ.

Several months before the ascites began, he got into a fracas, and was beaten badly. He was not laid up, but says he did not feel well afterward, and is disposed to attribute his disease thereto.

Advised to continue to tap when the abdomen refills, with tonics, hygienic measures, and abstinence from spirit, continuing the use of ale moderately. (*Private records of Dr. Flint.*)

July 1. A specimen of blood was taken from the arm for examination.

Analysis of the blood for cholesterine.—The blood was treated in the usual way, and a quantitative analysis made for cholesterine, with the following results:—

Quantity of blood	251.567 grains.
" " cholesterine	0.062 "
Proportion of cholesterine to 1,000 parts of blood .	0.246 "

The following table shows the comparative quantity of cholesterine in these specimens, and in the three specimens of healthy blood.

HEALTHY BLOOD.	Cholesterine per 1,000 pts.	BLOOD OF CIRRHOSIS.	Cholesterine per 1,000 pts.
Male, æt. 35 . . .	0.445	CASE III. Cirrhosis (severe)	0.922
" " 22 . . .	0.658	CASE IV. Cirrhosis (mild) .	0.246
" " 24 . . .	0.751		

CASE III. Cirrhosis (severe).	Percentage of increase in cholesterine over minimum of healthy blood .	107.190
	Ditto over maximum	22.769
CASE IV. Cirrhosis (mild).	Percentage of decrease in cholesterine below minimum of healthy blood .	42.469

These two cases present a very striking contrast; and the chemical examination of the blood has shown as marked a difference in the quantity of cholesterine, as in the gravity of the attendant symptoms. It teaches, however, an important lesson. *We do not always have an accumulation of cholesterine in the blood when the structure of the liver is altered; it being requisite that this alteration should involve enough of the organ to interfere with the elimination of this substance.* The quantity may even fall below the natural standard, in a patient who is rendered anemic by the consequences of a cirrhosis, which is not sufficient to induce cholesteremia. The process of nutrition being thereby diminished in activity, the production of this substance, by destructive assimilation, is necessarily dimi-

nished. The cholesteremia may be slight and transient; for the causes which produce it may be, to a certain extent, temporary. In Case III. we have the patient confined to the bed, suffering acute pain over the region of the liver, in all probability due to a slight degree of inflammation. This interfered with the excretion of cholesterine, and we find its proportion in the blood increased to 22.769 per cent. over the maximum, and 107.190 over the minimum.[1] As the patient was somewhat enfeebled by syphilis before the symptoms of disease of the liver made their appearance, it is probable that the quantity of cholesterine in the blood did not mount up to the highest standard in health. At all events, there was a notable increase even over the maximum quantity. Case IV. is not less instructive. Here we have a patient who has had cirrhosis of the liver, with ascites, for eighteen months, and has been tapped upwards of thirty times. He apparently has suffered from nothing more than the mechanical effects of the liquid, which has interfered at times with digestion, and rendered him anæmic. He is tapped, and immediately relieved, going out the next day. We do not seem to have any interference with the functions of the liver, as far as the symptoms are concerned, other than the mechanical obstruction to the circulation, and the case, in its symptoms, resembles one of those cases of ovarian dropsy where we have the patient carrying about an immense quantity of water, but suffering only from this circumstance, and relieved temporarily when the water is removed. Considering the state of the patient, we should not be surprised to find the cholesterine of the blood not increased, but diminished in quantity; and we may, I think, come to the conclusion from the symptoms, as well as the analysis of the blood, that though the liver was affected sufficiently to produce obstruction of the circulation, there was not sufficient disease to produce cholesteremia.

It is evident that much more extended observations are necessary in order to establish the clinical relations of cholesteremia without jaundice; but the case of Mary Perkins shows that this condition does exist, while the case of Thomas Hughes shows that it does not follow structural change in the liver, unless the lesion be extensive. The fact that we may have poisoning of the blood by the retention of a biliary matter, *without discoloration of the skin*, is exceeding important; and of this there seems to me to be no doubt. When we have a patient who has structural disease of the liver, and presents symptoms of blood-poisoning, he is suffering under *cholesteremia*, though there be no icterus. The cholesteremia may vary in degree from the mildness which characterized Case III., in which it was, perhaps, temporary,[2] to the grave condition mentioned by Frerichs, characterized by noisy delirium and coma, and announcing a speedy fatal termination. When we add to these conditions the cases of what is ordinarily

[1] Unfortunately the character of the stools was not noted.

[2] The patient having gone out of the hospital, it was impossible to settle this point experimentally.

called biliousness, attended with drowsiness, an indefinite feeling of *malaise*, constipation, etc. (and all this relieved by a simple mercurial purge, which is said to promote the secretion of the liver), cannot we hope that some light will be shed on their pathology by a knowledge that there is a condition called cholesteremia? As yet this is but speculation; but the discovery of the important function of cholesterine opens an almost boundless field of inquiry in this direction; and ere long the physician may talk of "biliousness," and "liver complaint," with some definite ideas of their pathology.

The following table gives the results of the quantitative analyses for cholesterine, which have been referred to in this article.

Table of Quantitative Analyses for Cholesterine.

		Quantity examined.	Cholesterine per 1,000 pts.
		grains	
Human blood from the arm.	Healthy male æt. 35 . .	312.083	0.445
" " "	" " æt. 22 . .	187.843	0.658
" " "	" " æt. 24 . .	102.680	0.751
" " "	Simple jaundice, . .	212.428	0.508
" " "	Cholesteremia with jaundice	50.776	1.850
" " "	Cirrhosis (grave), . .	117.193	0.922
" " "	" (mild), . .	251.567	0.246
" " "	Hemiplegia—		
	Case I. Paralyzed side .	55.458	—
	Sound side .	128.407	0.481
	Case II. Paralyzed side .	18.381	—
	Sound side .	66.396	0.808
	Case III. Paralyzed side	21.824	—
	Sound side .	52.261	0.579
Blood from carotid	Dog experiment	179.462	0.774
" " internal jugular	Dog experiment . .	134.780	0.801
" " femoral vein	Dog experiment	133.886	0.806
" " carotid	Dog experiment . .	140.847	0.768
" " internal jugular	Dog experiment . .	97.811	0.947
" " carotid	Dog experiment	143.625	0.967
" " internal jugular	Dog experiment. . .	29.956	1.545
" " femoral vein	Dog experiment	45.035	1.028
" " carotid	Dog experiment	159.537	1.257
" " portal vein	Dog experiment . .	168.257	1.009
" " hepatic vein	Dog experiment	79.848	0.964
Human brain (subject killed instantly) . . .		159.753	7.729
" (Case II., killed instantly) . . .		150.881	11.456
Human bile (specimen from Case II.)		224.588	0.618
Crystalline lens (4 lenses from the ox)		135.020	0.907
Meconium		170.541	6.245

CONCLUSIONS.—The observations contained in the preceding article seem to the writer to justify the following conclusions:—

1. Cholesterine exists in the bile, the blood, the nervous matter, the crystalline lens, and the meconium, but does not exist in the feces in ordinary conditions. The quantity of cholesterine in the blood of the arm is from five to eight times more than the ordinary estimate.

2. Cholesterine is formed, in great part if not entirely, in the substance of the nervous matter, where it exists in great abundance, from which it is taken up by the blood, and constitutes one of the most important of the effete or excrementitious products of the body. Its formation is constant, it always existing in the nervous matter and the circulating fluid.

3. Cholesterine is separated from the blood by the liver, appears as a constant element of the bile, and is discharged into the alimentary canal. The history of this substance, in the circulating fluid and in the bile, mark it as a product destined to be gotten rid of by the system, or an excretion. It pre-exists in the blood, subserves no useful purpose in the economy, is separated by the liver and not manufactured there, and, if this separation be interfered with, accumulates in the system, producing blood-poisoning.

4. The bile has two separate and distinct functions dependent on the presence of two elements of an entirely different character. It has a function connected with nutrition. This is dependent on the presence of the glyco-cholate and tauro-cholate of soda, which do not pre-exist in the blood, subserve a useful purpose in the economy, and are not discharged from it, are manufactured in the liver and peculiar to the bile, do not accumulate in the blood when the function of the liver is interfered with, and are, in short, products of *secretion*. But it has another function connected with depuration, which is dependent on the presence of the cholesterine, which is an *excretion*. The flow of the bile is remittent, being much increased during the digestive act, but produced during the intervals of digestion, for the purpose of separating the cholesterine from the blood which is constantly receiving it.

5. The ordinary normal feces do not contain cholesterine, but contain *stercorine* (formerly called seroline, from its being supposed to exist only in the serum of the blood), produced by a transformation of the cholesterine of the bile during the digestive act.

6. The change of cholesterine into stercorine does not take place when digestion is arrested, or before this process commences; consequently, stercorine is not found in the meconium, or in the feces of hibernating animals during their torpid condition. These matters contain cholesterine in large abundance, which also sometimes appears in the feces of animals after a prolonged fast. Stercorine is the form in which cholesterine is discharged from the body.

7. The difference between the two varieties of jaundice with which we are familiar, the one characterized only by yellowness of the skin, and comparatively innocuous, while the other is attended with very grave symptoms, and is almost invariably fatal, is dependent upon the obstruction of the bile in the one case, and its suppression in the other. In the first instance, the bile is confined in the excretory passages, and its colouring matter is absorbed, while in the other, the cholesterine is retained in the blood, and acts as a poison.

8. There is a condition of the blood dependent upon the accumulation of cholesterine which I have called *Cholesteremia.* This only occurs when there is structural change in the liver, which incapacitates it from performing its excretory functions. It is characterized by symptoms of a grave character, referable to the brain, and dependent upon the poisonous effects of the retained cholesterine on this organ. It occurs with or without jaundice.

9. Cholesteremia does not occur in every instance of structural disease of the liver. Enough of the liver must be destroyed to prevent the due elimination of the cholesterine. In cases in which the organ is but moderately affected, the sound portion is capable of performing the eliminative function of the whole.

10. In cases of simple jaundice, when the feces are decolorized and the bile is entirely shut off from the intestine, stercorine is not found in the evacuations; but in cases of jaundice with cholesteremia, the stercorine may be found, though always very much diminished in quantity, showing that there is an insufficiency in the separation of the cholesterine from the blood, though its excretion is not entirely suspended. After death, but a small quantity of bile is found in the gall-bladder.

In concluding, I beg leave to express my acknowledgments to my assistant, Mr. Henry E. Paine, of Providence, R. I., one of the residents of the Bellevue Hospital, who has assisted me indefatigably in the analyses and experiments which form the basis of this paper; and to whose intelligent aid I am greatly indebted for the amount of labour which I was enabled to accomplish in a comparatively short time. This aid, with the advantages of the great hospital at Blackwell's Island, which was laid under contribution for the pathological observations, enabled me to carry on a portion of the analyses uninterruptedly for about two months.

EXPLANATION OF THE PLATES.

FIG. 1.—Cholesterine extracted from the meconium. $\frac{4}{10}$ inch objective.

FIG. 2.—Stercorine and fatty matters from the blood of the carotid artery. $\frac{1}{12}$ inch objective.

FIG. 3.—Cholesterine and small broken crystals of stercorine from the same specimen of blood from the carotid, examined eleven days after. Nachet, No. 3 objective.

FIG. 4.—Cholesterine from the brain. $\frac{1}{6}$ inch objective.

FIG. 5.—Cholesterine from the blood of the internal jugular, with a few needles of stercorine. $\frac{1}{6}$ inch objective.

FIG. 6.—Cholesterine and stercorine from the same extract as Fig. 5, examined the next day. $\frac{1}{2}$ inch objective.

FIG. 7.—Cholesterine and stercorine from the blood of the vena cava. $\frac{1}{6}$ inch objective.

FIG. 8.—Cholesterine from the blood of the portal vein. $\frac{1}{2}$ inch objective.

FIG. 9.—Cholesterine from the blood of the hepatic artery. $\frac{1}{2}$ inch objective.

FIG. 10.—Cholesterine and stercorine from the blood of the hepatic artery. $\frac{1}{2}$ inch objective.

FIG. 11.—Fatty substances from the blood of the hepatic vein. $\frac{1}{12}$ inch objective.

FIG. 12.—Cholesterine and stercorine from the same specimen, examined the following day. $\frac{1}{2}$ inch objective.

FIG. 13.—Cholesterine extracted from the bile. $\frac{1}{6}$ inch objective.

FIG. 14.—Stercorine from the human feces. $\frac{1}{10}$ inch objective.

FIG. 15.—Stercorine from the same specimen, after it had been melted, placed on a glass slide, covered with thin glass, and allowed to crystallize. The crystallization was very slow, occupying some weeks. This Fig. shows the splitting up of the borders and points of the crystals with the globules referred to on page 340. The globules were of variable size, and some of them were arranged in rows, which, with an inferior glass, might have been mistaken for varicosities on the needles. From their appearance in this specimen, after it had been so thoroughly purified, I am inclined to change the opinion expressed page 340, and regard them as composed of stercorine and not fatty impurities. $\frac{1}{6}$ inch objective.

ART. II.—*Notes on Arrow Wounds.* By J. H. BILL, M. D., Assistant Surgeon U. S. A. (With three woodcuts.)

THE arrow is a weapon of the greatest antiquity. It is one with which, in this country, at least, we are all familiar; nevertheless, there is nowhere now extant an account of the wounds produced by it sufficiently accurate or definite to guide a surgeon in their treatment, or to give to the medical antiquary a record of their history and appearance. Before long these wounds will become of unfrequent occurrence, for our Indian tribes are fast being exterminated. We propose, in the first place, as a matter of historical interest, to state in this article what we know of arrow wounds. The subject still presents much of practical interest to the surgeon, and must continue so to do, in a greater or less degree, for the future. It will be some time before all our Indian tribes are "civilized off the face of all creation," and many a soldier and settler has yet to pay the death penalty for his courage or hardihood. Moreover, the bow and arrow is in use among the Tscherkesses of the Russian army, for the purpose of picking off sentinels without creating an alarm.[1] It is probable that a corps of carefully selected bowmen would be found of great use in our own army for like purposes. Franklin has suggested the employment of arrows in battles, to be shot from bows or fired from guns. Arrow wounds are, therefore, and for some time likely to be, of practical interest.

[1] Vide McClellan, Military Commission to Europe.

So much as an apology for the appearance of this article.

As is well known the arrow is the favourite weapon of all our Indian tribes, and it is such because in skilful and desperate hands the wound which it inflicts is attended with a fatality greater than that produced by any other weapon—particularly when surgical assistance cannot be obtained. The weapon is constructed not only to disable an antagonist, but also to kill sooner or later its victim.

In order fully to appreciate the subject of arrow wounds, it will be necessary to understand the mechanism and construction of the arrow itself. Let us briefly explain this.

The arrow is composed of two parts, a shaft and a head. The shaft varies in length from two to three feet. Usually it is made from a *limb* of the dogwood tree. A limb of a quarter-inch diameter is taken, soaked in water, the bark peeled off, and then cut into suitable lengths.

The straightening process is now commenced. The ends of the piece to be straightened are squared off, and two small and flat strips of wood placed transversely, as regards the long axis of the piece, and firmly lashed one to each end of the latter, in the manner of a cross. One of these sticks is held between the teeth, whilst the other is grasped by the hand. This end is now twisted to and fro by rotating the slip grasped by the hand, after the manner of a trephine. The fibres of the stick to be straightened after a while assume a spiral twist at the same time the stick itself is found to be straight. It often will require three days to straighten a single shaft. A notch is now filed at one end for the bowstring, and a slit made in the other to receive the straight quadrangular stem which comes off from the base of the head. The head is made of soft hoop iron, filed into the form of an isosceles triangle, and furnished with a stem to attach it to the shaft. This stem is an inch long by one-eighth of an inch broad, and is of one piece with the rest of the head. An arrow-head varies in length from half an inch to two inches, and half an inch to three-quarters of an inch in breadth at its base. No two arrows are alike. The stem at the base of the arrow-head is pushed into the slit made for it in the shaft, and held there by wrapping narrow ribbons of tendon spirally around the split sides of the latter, thus clamping these together, and the stem itself closely in their embrace. If it were not for these ribbons the head would be held loosely. It is then this ribbon of tendon that gives solidity to the arrow, and makes of a head and a shaft a perfect and a most dangerous weapon. The tendon removed and the weapon falls to pieces.

Such being the mechanism of the arrow, we can readily understand the danger peculiar to arrow wounds in general, a danger often seen in pistol-ball wounds of the chest. Let us suppose a case to illustrate and explain our meaning. An arrow is shot at a man at a distance of fifty yards. It penetrates his abdomen, and without wounding an intestine or a great vessel, lodges in the body of one of the vertebræ. The arrow is grasped by

the shaft by some officious friend, and after a little tugging is pulled out. We said the arrow is pulled out. This was a mistake; it is the shaft only of the arrow that is pulled out. The angular and jagged head has been left buried in the bone to kill—for so it surely will—the victim. The explanation of such mishaps is this: the ribbon of tendon which compressed together the split sides of the end of the arrow, and so clamped the head and the shaft together, had become wetted with the fluids effused in the course of the wound. When wetted, it was, of course, lengthened, and, if lengthened, loosened. It ceased longer to bind together the split sides of the shaft; this and the head were, consequently, very feebly united and readily detached. Experience has abundantly shown, and none know the fact better than the Indians themselves, that any arrow wound of chest or abdomen, in which the arrow-head is detached from the shaft and lodged, is mortal. From this we conclude that the danger *peculiar* to all arrow wounds is, *that the shaft becoming detached from the head of an implanted arrow, leaves this so deeply imbedded in a bone that it cannot be withdrawn, and that, remaining, it kills.* It is not possible with forceps to extract an arrow-head so lodged (if lodged deeply), throwing aside the difficulty of discovering and the danger of searching for it. The blades of forceps long enough for this purpose (supposing the foreign body deeply lodged in the chest) would bend too readily with the force required for the removal of the missile. The greatest force is sometimes required for the extraction of an arrow-head so lodged. We have seen an arrow shot at a distance of one hundred yards, so deeply imbedded in an oak plank, that it required great force, applied by strong tooth-forceps, to remove it. In the case of a man shot in the shaft of the humerus by an arrow, it was only after using both knees, applied to the ends of the bone as a counter-extending force, and a stout pair of tooth-forceps, that we succeeded in removing the foreign body. Another similar case will be mentioned hereafter. Asst. Surgeon McKee had a case, also, in which considerable force was required to extract an arrow-head lodged in the trochanter, and other instances illustrating the difficulty sometimes encountered in the removal of arrow-heads lodged in bone could readily be adduced.

We have dwelt thus at length upon the mechanism of the arrow because we consider that upon a rightful understanding of the same must depend an intelligent and a skilful treatment of the wound which it occasions. The arrow-head removed by proper treatment, and we have an ordinary punctured wound, such as a poniard or stiletto would make. The wounds inflicted by these last named weapons are dangerous and troublesome for this reason. When such a weapon pierces any deep tissue, it must do so through some other tissue possessed of a contractile or muscular power. As soon as the weapon is withdrawn, this last named tissue contracts, and thus draws the wound in itself upwards or downwards, interrupting the continuity of the wound as a whole; whence it happens that all such

wounds, the pus or effused liquids finding no outlet, are apt to be attended with burrowing of matter and deep-seated abscess. This remark applies to arrow wounds, although they partake of the nature of incised wounds, and, therefore, oftener heal by first intention than do the punctured wounds of the stiletto or bayonet, attended as these are with much bruising and tearing of tissues. Arrow wounds are often complicated by profuse hemorrhage, and for the same reason that in bayonet wounds abscesses form, through inability of matter, to find a ready outlet, in arrow wounds hæmatomata result. In fact, when arrow wounds suppurate, they generally do so through disorganization of these collections of blood.

It is occasionally the practice of some of our Indian tribes to poison their arrows. The plan pursued is this (on the testimony of a Moquis Indian.) The liver of some animal is exposed, and a rattlesnake compelled to insert his fang into it. The animal is at once killed, the liver removed, and wrapped up in the skin and buried. After seven or eight days the bundle is dug up, and the arrow-heads dipped in the pulpy and putrescent mass inclosed in the skin. After they are dry they are dipped in blood, again dried, and preserved for use.

We have never witnessed this process, but have seen arrows said to have been subjected to it. A horse, however, was shot on a late Nabajoe campaign in the flank with an arrow. He swelled up enormously, evidently suffered much pain, and died in the course of a night, certainly from the effects of a poison, as the wound inflicted by the arrow was not mortal, either from its seat or its severity. Strange to say such arrows are of infrequent use. Among some seventy-six cases of arrow wounds received from Nabajoe, Apache, and Utah Indians, we have seen no case of poisoned arrow wound in the human subject, nor have we heard of such a case, after careful inquiry. Of course a wound of this nature, if it involves parts beyond the reach of knife or cautery, is fatal.

What parts of the body are oftenest wounded by the arrow, and what is the relative fatality? The following table of cases, falling principally under our own observation, will show:—

	HEAD.				CHEST.			ABDOMEN.				
	Brain wounded.	Brain not wounded.	Spinal Marrow.	Neck.	Lung wounded.	Lung not wounded.	Heart.	Intestine wounded.	Intestine not wounded.	Upper Extremity.	Lower Extremity.	Total.
Number of cases saved	1	2		2	2	9			3	27	5	51
" " " died	2		1		4		2	15	3[1]	1	1	29
Total	5		1	2	15		2	21		28	6	80

[1] One of these perished from a gunshot wound.

The above table includes all the reliable cases of arrow wounds falling under our notice.

On referring to it, it will be seen that the upper extremity is oftenest wounded, next comes the abdomen, next the chest, next the lower extremity, next the head, and, lastly, the neck. The reason that the upper extremity is so often wounded, is that a person can see an arrow darting towards him, and very naturally putting out his arm to ward it off, receives a wound oftener in this member than in any other. Wounds of the abdomen are oftenest fatal (more than three-fifths of the total deaths occurred from wounds of abdomen), next come wounds of chest, wounds of head and heart next, and wounds of spinal marrow, and upper and lower extremity are last.

An expert bowman can easily discharge six arrows per minute, and a man wounded with one is almost sure to receive several arrows. In the above table, when a man was wounded in more places than one, the most serious wound, or that which immediately caused his death, is recorded. We have not seen more than one or two men wounded by a single arrow only. In three of our soldiers shot by Nabajoes, we counted forty-two arrow wounds; this is an extreme case, as the manufacture of the arrow costs the Indian too much labour and time to expend one unnecessarily. The cause of death in the twenty-nine fatal cases may be thus summed up:—

CAUSE OF DEATH.	Immediate Hemorrhage.	Peritonitis.	Compression of brain.	Wound of Heart.	Empyema.	Tetanus.	Pneumonia.	Wound of Sp. Cord.	Other Injuries.	Total.
Number of cases	7	13	2	2	1	1	1	1	1	29

Keeping in view the real cause of dread in arrow wounds—to wit, the lodging and fixation of the iron head in a bone—let us now proceed to consider the subject from a more limited view, and investigate the arrow wounds of each separate part of the body.

First, then, for the simplest case; an arrow wound involving no parts essential to life. Let us suppose a case.

A man is shot by an arrow which passes through integuments and muscles, and grazing the bone, makes its exit on the other side of a limb. What appearance is presented after the accident? We will find at the spot where the arrow entered, a very small and narrow slit, surrounded by a circular patch of bruised integument of a dusky-red colour. It is almost impossible to say whether the slit was made by a pistol-ball or an arrow, so closely does the entrance wound made by an arrow resemble that made by a small ball. On the other side of the limb another slit, somewhat larger than that above described, is seen, but not surrounded by the red areola. This is the exit wound. What is the treatment? Apply cold or

evaporating lotions, place the limb at perfect rest, let the patient diet himself, and the chances are favourable of such a wound healing by first intention. At all events this is the indication. Ordinarily, such a wound will be quite well in a week. If we fail in our efforts at healing by first intention, and matter forms, bandages, compresses, and an early evacuation of the collection is the treatment; generally, the pus will find its way to the surface by the wound. It is not considered necessary to illustrate further, although numerous cases might be cited in support of what we say. In such cases the rule for any other punctured and incised wound obtains. If any artery is divided, follow Guthrie's rule, and tie the divided vessel in the wound itself, securing both the cardiac and distal ends of the artery. We have seen but one case of a large artery of a limb divided by an arrow, and that case terminated fatally before we saw the man. He was a Mexican, and was shot in the groin while on horseback. The arrow pierced the femoral artery just below Poupart's ligament. The man lived twelve hours, but was brought into the post dead. The possibility of the deep vessels of a limb being pierced by an arrow, must be apparent to any one, and it is as well to keep it always in mind, and be prepared to tie the vessel before a diffused traumatic aneurism is formed, which would greatly increase both the danger and difficulty of the operation. Suppose a nerve-trunk has been partially divided, and all the unpleasant symptoms consequent on such an accident ensue, what is to be done?

In such a case we think a surgeon justifiable in enlarging the wound, and completing the division of the nerve.

Private Martin, of the 3d Infantry, was shot in his right leg by an arrow —the arrow passing out. I saw him shortly after the receipt of the injury. The only thing remarkable was the agonizing pain, referable to the small toes and outside of foot. I suspected a wound of the musculo-cutaneous nerve, and decided to cut down upon it, and, if necessary, to divide it. This I did, and found the nerve as I had diagnosed, wounded. I divided it, and the pain ceased, numbness taking its place. The man did well, the *wound healed* by granulation, and ultimately sensation was regained in the outside of the foot. The man was sent to duty on the twenty-eighth day. Of course, such a procedure will not be rashly undertaken on a large nerve-trunk, nor in any case in which pain is absent.

If an arrow, instead of passing through a limb, strikes a bone, it will lodge, and that, too, so deeply, that nothing but forcible traction and judicious movement will extract it. The wound should be enlarged with a bistoury, as the shaft of an arrow is always so tightly grasped by the tissues through which it passes, that a forceps cannot be introduced for its extraction. An incision an inch to two inches in length will suffice, but it must divide to this extent all the tissues, through which the arrow has passed. After this has been made, pass down a finger, and explore the parts; ascertain the position, seat, and depth of the arrow-head in the bone. Then guide down upon the finger a pair of straight tooth forceps, and make these em-

brace the arrow-head; remove the finger gently, till the arrow shifts from side to side, so as to loosen its seat in the bone. Firm traction being now made on the head by the forceps, the extraction will be sufficiently easy. Treat the wound as a simple arrow wound. Supposing that the shaft has become detached from the head of the arrow before the patient is seen. This is an unfortunate occurrence. Frequently we will fail in detecting the arrow-head, and even if found, its extraction must be a matter of difficulty. The wound should be enlarged, and the finger used for exploring, as in the previous case. If the head is found, the forceps must be applied, the finger disengaged from the wound, and the forceps firmly grasped. A gentle rocking motion of the handles of the latter, such as a dentist uses to extract a tooth, will, if enough of the arrow-head projects out of the bone, suffice to disengage it. If it is deeply buried, nothing but sheer brute force will accomplish its extraction. The following is a case in point.

Private Bishop was shot in the head of the humerus with an arrow, and the shaft having been plucked out, the iron head was left deeply imbedded in the bone. The man was in great pain, synovia was flowing out of the wound, and all motion was lost. I enlarged the wound, introduced my finger, and so ascertained the position and depth of the arrow-head. It was very deeply implanted. I introduced forceps, seized it by its base, but could obtain scarcely any "purchase." I at last succeeded in grasping it tightly, and bracing my knees against the patient's thorax, I applied all the traction I could muster. Suddenly the arrow-head flew out of its seat, and I would have fallen on the floor, had not the steward caught me. The wound healed well. It was treated by evaporating lotions, and a rigorously antiphlogistic diet for the patient. Motion in the joint was not lost, though somewhat impaired.

I have already alluded to another case, in which I removed an arrow from the shaft of the humerus by bracing the end of the humerus against my knees, and then applying all my strength to the foreign body by means of forceps.

There is yet one case of arrow wound of limb of which we must speak, in which the head lodges in a bone, but with a curious modification. It is this. The point of the arrow-head scrapes the bone near the edge of this latter, and just as it does so, the muscles of the limb contract violently, and bend the point of the weapon. The arrow passes on, and again the muscles contract, and again the point is bent, and so on; so that by the time the progress of the arrow is arrested, its head is bent to resemble a fish-hook, the point, however, being firmly implanted, and immovably bound down to the bone by the periosteum and cartilaginous structures, which it has stripped off from their attachments. Of course, the greater the traction applied to an arrow-head so lodged, the more firmly will it be imbedded. In such a case, the finger carried down to the foreign body, gives us all the information that is needed, and it is just because such cases as these are of rather frequent occurrence, that the digital examination of arrow wounds should

always be practised, when possible. In such a case, the head of the arrow having been seized by forceps, as usual we vibrate these from side to side, but instead of pulling, we gently push, so as to disengage the point of the head from any lodgment it may have made in the bone, and then by gentle movements of a rotatory character, aided by the finger, the final removal of the foreign body will not be difficult. The finger should be kept on the point of the bent arrow-head, in order to prevent entangling this in such tissues as may be in the way.

We have seen two cases such as that above described, and have heard of two others.

The first case was that of a Mexican shot by an Apaché, the arrow-head striking the ulna in its upper third. The man withdrew the shaft immediately, and then came to me. I enlarged the wound, and prudently made an examination with my finger. The entrance wound of the arrow was on the flexor side of the forearm, about an inch below and to the inside (ulnar side) of the coronoid process of the ulna. The ulnar artery was on the radial side of the wound. On passing my finger down, I readily found the arrow-head, but it had wrapped itself around the bone, its point being imbedded in the periosteal tissues of the outer (radial) side of the ridge on the posterior surface of the ulna. With a little care, I readily extracted the missile. Like all such wounds, this one healed readily.

The second case was that of Corporal Scott, shot at Fort Defiance, by a Nabajoe. I enlarged the wound, and followed the arrow shaft with my finger until I reached the iron head. The arrow had entered on the posterior and outer aspect of the leg, penetrated the muscles of the calf, scraped the fibula about two inches from its head, and then wrapped itself firmly around this bone. The hemorrhage being very profuse and arterial, I extracted the foreign body as soon as possible. I then searched for the bleeding vessel (muscular branch of the peroneal), and tied it at one end. The other I could not find. The wound did well until the second day, when hemorrhage returned. I failed to find any bleeding vessel, so I used the anhydrous chloride of iron, made by the sublimation process, and dissolved in very strong syrup.[1] The wound was sponged out, and the solution containing twenty grains of anhydrous chloride, finely powdered, dissolved, and suspended in strong syrup, injected into the wound by means of a syringe. This treatment succeeded, and the hemorrhage did not recur. The man made a tedious recovery.

Dr. Kennon informs us that he had a case of this kind, in which he removed from the thigh of a Mexican an arrow-head which had been lodged six months previously in the femur. The surgeon attending the man at the time of the accident, had failed to remove the foreign body, contenting himself merely with a withdrawal of the arrow shaft. The head had there produced abscesses, caries, and infiltration of tissues with pus, and the most serious constitutional symptoms, the patient being brought to the verge of the grave with hectic. Dr. K. instituted a search for the cause of the mischief, and after a prolonged and bloody dissection, came upon it. He found

[1] The object in using strong syrup for the solution and suspension of this substance, is to preserve it anhydrous. *Vide* an article by author in *Am. Journ. of Pharmacy*, for July, 1858. As prepared in a strong syrup, we regard this as the best of the hæmostatics.

that the soft iron of which the head was made, had bent into a semicircle, and that the femur was half surrounded by this. The doctor extracted the missile, supported the limb on a splint, applied compresses and bandages, and administered the proper constitutional treatment. The man recovered a good use of his limb.

A fourth case, illustrating this peculiar accident, occurred in the practice of Asst. Surgeon Clements, U. S. A., during the last campaign against the Nabajoes. A surgeon was shot through the upper part of the posterior fold of the axilla with an arrow, which penetrated deeply. The shaft was pulled out, leaving the head imbedded. The man then went to the doctor. The case was treated by Dr. Clements for six weeks or two months, but without benefit, and finally it was decided that the arrow-head must be removed. The doctor accordingly made a T-shaped incision over the scapula, cutting through integument and muscle, and exposing the bone. The foreign body was, after some search, found, but so twisted and bent, that notwithstanding the large incisions made, it was only after the application of some force by strong tooth-forceps, that the head was removed. Secondary hemorrhage took place twelve hours after, but was checked by (we believe) the actual cautery. The man slowly recovered.

We should gladly have given this case in full, had we been acquainted with all the particulars. It illustrates, in addition to the peculiarity in the nature of the wound, the proper treatment in all such cases.

If a surgeon is called to a case in which an arrow-head is left lodged in a bone, and in which, from any cause, immediate extraction is impossible, what should be the treatment? Shall cold applications and rest, and all the usual means for subduing inflammation be enjoined! We answer, no. In the first place, such means will be perfectly futile. An arrow-head cannot become encysted like a ball; it presents too many sharp angles and edges, and is too generally irritating for any such event to be expected. Nor will it become encased in bone. The inflammation which it will always produce, is the effort of nature to throw off the foreign body, and it cannot be checked. It will go on to suppuration, abscesses will form, and pus will burrow, until at length, if some active interference is not interposed, the member is rendered worthless. In such a case, the treatment must be expectant. Place the limb on a splint, make the orifice of the wound the most depending portion thereof, and finally introduce a sponge-tent, or, what is better, perhaps, a drainage-tube of Chassaignac. From a fair trial of this instrument in several cases of gunshot wound, we can cordially recommend it both in gunshot wounds, and in all wounds where deep suppuration is expected. In addition to a tent or drainage-tube, bandages and compresses will be found necessary, particularly towards the conclusion of the case. They should never be applied so tightly as to produce uneasiness, but should always keep up just that amount of pressure which will serve to prevent the burrowing of matter, and check motion of the muscles. Perhaps, after pursuing this course for a while, the arrow-head may be detected, and if detected, extracted with facility. In any event, frequent search should be made for it. Generally, we will at length succeed in re-

moving the foreign body; but all things else failing, as time, strength, and patience may, we must operate.

It is not possible to lay down any fixed rules for such an operation. The incisions should be large and free—boldness rather than prudence governing our actions. We might as well cut the patient's limb up until we do find the arrow-head, for if it is left, amputation will be necessary, and worse than this can hardly ensue from the "cutting up" we have advised. We would, if we undertook such an operation, make up our mind to find the arrow-head, even if it were necessary to tear up every fasciculus of every muscle of the injured member. It is just in such cases as this that the motto, "Operative surgery is the art of cutting and tying what you cut," finds its best exemplification. As such a wound will be attended with hemorrhage, rendering all its steps more difficult, it will be proper to compress the main artery of the limb by the hand of an assistant. Having thus briefly considered the subject of arrow wounds of parts not essential to life, let us recapitulate.

1st. An arrow passing through a limb makes a clean half punctured, half incised wound, which will generally heal by first intention, if proper treatment be instituted.

2d. An arrow lodging in bone requires some force, much tact, strong forceps, and an ample incision for its removal.

3d. This removal should always be effected as soon as possible after the receipt of the injury, *and the greatest care taken in doing so not to detach the shaft from the head of the arrow.*

4th. Always use the finger to explore the lodgment of an arrow-head, and to determine whether it is bent or straight.

5th. If we fail to detect or to extract an arrow-head lodged in bone, we wait a few days, trusting to suppuration, tents, position, etc., and then search again and again for it.

6th. If we fail in removing the foreign body by these means, we operate, making large incisions and compressing the artery of the limb.

Let us now proceed to consider arrow wounds of the head. An arrow, unless it strikes at a short range, or perpendicularly to the skull, will usually glance off, making a scalp wound—a wound here requiring no particular notice, as it presents nothing peculiar.

An arrow wound of the orbit will usually be mortal, the missile easily penetrating the bones of the skull in this situation and then wounding the brain. We have not seen such an injury, but have been informed by Nabajoe Indians that when the Delawares, in 1845, made an invasion of their country, one of the band was wounded in this manner and died immediately. History assigns King Harold's death to an arrow wound of the orbit.

If an arrow should strike the skull at a short range and perpendicularly to its surface, it will probably penetrate. In doing this the arrow-head

makes in the outer table by compressing the particles of bone surrounding it, a narrow puncture of the width of the thickness of the arrow-head, and of the length of the breadth of the same; a puncture such as it would make if pushed into a bit of wax. But in addition to this a crack usually commences from both ends of this puncture, and extends itself in an opposite direction from its fellow, over a distance proportional to the momentum which the arrow possessed. In its passage through the outer table, the arrow-head loses its momentum, and strikes the inner table with a greatly reduced velocity, a velocity not sufficient to allow the arrow-head to penetrate it and pass into the substance of the brain; but enough to cause a scale of the inner table to be fractured off; and whilst still sticking to the point of the arrow-head, to be slightly driven upon (seldom into) the brain itself. Under these circumstances, the usual symptoms of compression will arise, as in any other case. The man falls insensible to the ground. Hence it happens that the surgeon is seldom called to treat such cases. The man being so wounded and insensible falls an easy prey to the vindictive savage who shot him, and such a chance is never neglected. If, however, we do have such a case to treat, we remove the arrow-head and elevate the depressed bone. Both of these indications will usually be filled by making gentle traction on the arrow-head; for as the arrow-head is withdrawn, it draws with it the scale of depressed bone, which is sticking to its point, until this last is elevated into its proper place. If, on removing the foreign body in the manner indicated, we find the symptoms of compression still present, we infer that we have failed to elevate the depressed bone. But in any such event we must trephine. We trephine not so much with the purpose of elevating the depressed bone as with the object of removing the cause of the compression, whatever this may be. The after treatment of such a case must be most strictly anti-inflammatory, the first signs of cerebral disturbance being met with bleeding and one smart purge. Croton oil has answered best in our hands. After the elevation of the fragment, close the wound with collodion, shave the head, apply cold unremittingly, and if inflammation does ensue, as indicated by cerebral derangements, treat it as above indicated. The bleeding, however, must be *ad deliquium*. If in any case suppuration should commence, and abscess form, then also we must resort to the trephine. Such a case will almost surely end fatally.

Miguel "Nigro," the post-guide at Fort Union, was shot with an arrow by a Utah Indian. I found the arrow-head sticking in the left parietal bone, the shaft having been detached. I made traction on it, and drew it out of the wound. The symptoms of compression present at once vanished, the man turned over and sneezed, and rose up on his feet. I had made arrangements to trephine the skull if necessary, but I had probably restored to its proper level that portion of the inner table which was depressed, so

that measure was unnecessary. The cause of the compression was gone, and I had nothing to trephine for. The next day the man complained of headache. His face was flushed, eyes suffused, pulse hard, and irregular. I ordered croton oil, shaved his head, and applied cold. Presently, when delirium came on, I bled him until he fainted. This bleeding was repeated the night of the same day. The next day he was greatly better; the croton oil had operated well. The man was left to recover, which he did in three weeks.

We have examined two other cases of arrow wound of skull. In both, the subjects were dead. In both there was a depression of the inner, with a fissure of the outer table. In one of the cases the wound was over the right frontal bone, and this was fissured into the coronal suture. The depressed portion of the inner table measured a half inch in diameter, and was firmly attached to the point of the arrow-head, so that on withdrawing this latter, I could readily elevate the depressed scale. The second case was that of an Indian, shot with an arrow, in one of the Wormian bones. The inner table was just barely pierced by the arrow-point. The fragment of bone depressed was driven upon the membranes over the left posterior cerebral lobe, without, however, tearing these. In neither case was hemorrhage observed; neither died immediately.

Lieutenant Maxwell was shot in the head by an arrow which penetrated his skull, wounding the brain, and killed him almost immediately. We did not see the case, and, therefore, we refrain from noticing it farther.

Arrow wounds of the trunk, from their greater importance and more frequent occurrence, comprise the greater part of our subject. The Indians know well the fatality of such wounds, and aim always at the umbilicus; hence one cause of the frequency of these wounds.

An arrow sometimes goes through the chest and passes out. It would always do so if it were not that it can scarcely miss hitting a bone. Hence it happens that a lung is not nearly so often wounded by an arrow as an intestine. Of fifteen cases of arrow wound of chest falling under our notice, in New Mexico, in seven cases only was the lung wounded, and in one of these, the heart was wounded also; and in four of these (rejecting the case complicated with heart wound) the patients died. In two, the death was by hemorrhage; in one, by empyema; in one by pneumonia, complicated with peritonitis.

An arrow wound of lung is from first to last more dangerous than a gunshot wound of the same parts. There are three reasons for this. First, the hemorrhage occurring at the time of the injury, or a few hours after, is much more profuse than in an ordinary gunshot wound. A ball going through the chest does not often give trouble from hemorrhage, unless it should wound a large vessel. The reason is, that a ball tears and bruises, while an arrow makes clean slits and punctures. Secondly, an arrow

wounding the lung, is almost sure to lodge, whilst a ball generally passes. Now, hear what Guthrie says about balls that lodge in the chest.[1]

"General McDonald, of the Royal Artillery, was present at Buenos Ayres when a bombardier of that corps received a wound from a two pound shot, which went completely through the right side, so that when led up to the general, who was lying on the ground, he saw the light quite through him, and supposed, of course, that he was lost. This, however, did not follow, and some months afterwards the man walked into General (then Captain) McDonald's quarters so far recovered from the injury as to be able to undertake several parts of his duty before he was invalided, *thus proving the advantage of a shot, however large, going through rather than remaining in the chest.*"

Why is this? Is it feared that a ball lodging will be more apt to induce pneumonia than one passing completely through the chest? Is it hemorrhage from wounded lung that is so much feared? No! It is the danger of exciting and keeping up a low form of inflammation of the pleural sac, such as is sure to lead to effusion of serum, and then to collections of pus in its cavity. In a word, it is the danger of empyema. Guthrie says of this[2]: "It is the great fact to be attended to in the treatment of pistol wounds of chest, or those made by small balls which do not pass through." Now if this applies to balls, it applies to arrows in a higher degree. If an arrow-head becoming detached from its shaft is *permanently* lodged in a vertebra, or a rib, empyema will result. The third danger peculiar to arrow wounds of lung is the supervention of emphysema twelve or fifteen hours after the receipt of the injury. It is rather an inconvenience than a danger.

In an attack made by a company of Mexicans on the Nabajoe Indians, thirty men were wounded, and twenty-two killed, or died of their wounds. Many of these cases were wounded by arrows. They all came under the writer's care. Of arrow wound of lung there were in all five cases; three of these died, two recovered.

Case I. Name unknown. Man found dead among many others; skull uninjured. Three arrow wounds, of which two wounded the lungs. Ground covered with pools of this subject's blood. Chest, on being opened, was found as follows: About two pounds of semifluid blood were found in left pleural sac, and a somewhat smaller quantity in the right. Bronchi, in places, engorged with blood. No large vessels injured. One arrow had lodged in the body of a vertebra. It had entered below the right nipple. The other arrow went through the chest from right to left and passed out. Subject was probably asphyxiated with blood.

Case II. Salvador Martinez, shot through chest with an arrow which entered between the fifth and sixth ribs on the right side, and passed out between the seventh and eighth on the left. The man vomited blood.

[1] Guthrie's Commentaries, p. 480. [2] Commentaries, p. 473.

Arrow had been extracted when I saw him. I had him taken to Fort Defiance, where he arrived very much exhausted. He rallied, however, and took a half a grain of sulphate of morphia at bedtime. The next morning an ordinary domestic enema was used, and the rectum washed out. As the stomach had evidently been wounded, I deemed it improper to allow nourishment to be taken into that organ. Accordingly, after the enema, about a half pint of beef essence and two ounces of wine whey were thrown up per anum and retained. Half a grain of morphia was then administered, and the patient left to repose. At 9 P. M. I found the patient's respiration very much embarrassed. There was pain and dulness on the left side; vesicular murmur absent. I opened by a probe the wound in the left side (which I should have stated had been closed with soft leather soaked in collodion), and so caused the discharge of a large quantity of blood, serum, pus, etc.; then cautiously enlarged this wound, and introduced a sponge tent. The difficulty and pain on breathing now ceased, and the respiration on the right side, which had been puerile, became vesicular. I now easily detected incipient pneumonia. I therefore ordered twelve cups to the chest, and f℥iss of tinct. opii, in a starch enema, to relieve pain.

The next day at 7 A. M. found the patient better; had slept a little, and has appetite. The rectum having been unloaded, twelve ounces of beef essence were injected. On removing the tent, the wound discharged some matter. Laudanum enema repeated at 9 P. M. The next morning at 7 A. M. found the man very uncomfortable and anxious, and complaining of colicky pains. Right lung was solidified, as it was dull on percussion, and tubular blowing was present. Sputa adherent to the vessel and more purulent. Pulse 110, and great pain on pressing the epigastric region. Twelve cut cups ordered; and at 2 P. M. beef essence enema. At 9 P. M. the patient was worse, peritonitis being well pronounced. The patient sinking; pulse 125, and very feeble. For the peritonitis, ordered sulphate of quinia, in ten grain doses per anum, in beef essence. Two enemata to be administered during the night. The next day at 7 A. M. the patient was a little better, but very weak. Ordered the quinia to be continued, and wine whey in enemata, every two hours. The patient had rejected iced champagne from his stomach. The sputæ were very tenacious; adhered to the vessel in which they were placed when it was inverted. Wound in left side discharging prodigiously. Has pain on pressure over the abdomen. At 9 P. M. found the man suffering considerably. Ordered a laudanum enema, the quinia to be given at 4 A. M. Next morning he was free from pain and much better. Quinia in small doses to be continued; beef essence and wine whey to be plentifully supplied. This treatment was continued until the patient's death, on the sixteenth day. The peritonitis yielded on the tenth day to the quinia treatment.

An inspection of the parts concerned showed the right lung solidified and engorged with pus. Left lung contained a cavity of the size of a turkey's egg, and was also much disorganized from the presence of pus in its tissue. The arrow had wounded the right lung, the liver, the stomach at its posterior and cardiac aspect, and, finally, the left lung. The wound in the stomach had healed, but the diaphragm contained two slits in it. The wound in the liver was open and communicated with the wound in the right lung. There were signs of recent general peritonitis.

Case III. Santiago Orliz was shot in the left armpit by an arrow. The shaft of the arrow had been pulled out two days before I saw him, leaving

the head firmly lodged in the fourth dorsal vertebra. The hemorrhage, I was informed, had been very great. His Mexican comrades restrained it by plugging the wound. I made an examination with a chest probe, but failed to detect the foreign body. I gave up the search, enlarged the wound, introduced a common tent, and contented myself with an expectant plan. In three days the wound discharged matter in large quantity. I again searched for the arrow-head but without success. The wound was made the depending part of the body, and I hoped that the foreign substance might make its way out, and, moreover, that empyema might be thus prevented. But all in vain, the man died asphyxiated from inability to throw off by his mouth the matter which was constantly being coughed up. Inspection ten hours after death showed a wound between the fourth and fifth ribs. The track of the arrow had healed for an inch or more, and thence was open to the fourth dorsal vertebra, which was found to have been wounded, the wound being filled up with a cartilaginous cicatrix. The pleural cavity was distended with matter, but did not communicate with the external wound; the pleura costalis and the pleura pulmonalis being united at this point. The pleural cavity communicated with the fistulous track in the lung tissue. I was deceived in this case; I supposed that the external wound would allow of the drainage of all the matter that could form, whereas, in fact, it did not allow of any discharge at all from the pleural cavity. I should have been more attentive to the physical signs in this case, and at least have made an exploratory puncture to determine the presence or absence of matter in the pleural cavity, and then I would have performed paracentesis. I found the arrow-head resting on the diaphragm, it having ulcerated through the pleura, and I have no doubt that in time it would have perforated the diaphragm and slipped into the abdominal cavity. It was very crooked; the long thoracic artery had been divided by the arrow-head, but no vessel of importance was injured.

Case IV. Private Connor, of the third infantry, was shot by Nabajoes with four arrows, all through the lung. He was alive when I reached him, but died in a few minutes, apparently asphyxiated with the torrents of blood pouring into his bronchi. I found the vena cava descendens pinned to one of the vertebræ by an arrow-head. The aorta was pierced by a small arrow-head, the wounds in the vessels being plugged perfectly by the arrow shaft.

The lung may be wounded with arrows in several places, and yet the patient recover.

Case V. A Mexican, name unknown, whilst travelling the road near Fort Defiance, was shot by Nabajoes with five arrows, all the arrows injuring the lung, and one of them passing through the upper border of the liver. I saw the man twenty minutes after the accident. The bleeding was most profuse, and the man fainted. Both lungs were wounded; I made the worst possible prognosis, but proceeded to extract the arrows, all of which I safely removed. After the hemorrhage had ceased, I applied muslin soaked in collodion to each of the wounds, eight in number, and had the patient put to bed, and given a grain of morphia. The next morning the patient was more comfortable than I had expected. He had been vomiting, and I gave him some acetum opii and acetate of lead, to quiet this and restrain secretion. In the afternoon the man complained of pain on the right side, and difficulty in breathing. I removed the dressing from the wound, involving the liver and lung, and broke up some clots where-

upon a considerable quantity of mixed fluids were discharged from the wound. These contained bile as I discovered by Pettenkofer's test. This procedure greatly relieved him, and he expressed himself much better. I ordered the prescriptions of the morning to be repeated. The next day the patient vomited a considerable quantity of black decomposed blood, and complained of the frequency of his urination. Urine very dark coloured, sp. gr. 1036; urine contained cholic acid and sugar. All medicines ordered to be discontinued. After this the patient gradually recovered, all the wounds healing by first intention, except that implicating the liver, and that ceased discharging on the sixth day. In two weeks the man left the hospital, his urine still containing sugar, but no bile. He had passed during his illness about thirty-six ounces per diem. In a few days the last traces of sugar disappeared from his urine, and in six weeks from the day he was wounded, he returned to the post from a scout, in order to have removed a large polypus of nasal cavity, which had plagued him a great deal during his sickness.

This case is remarkable, showing, as it does, what injuries a man may sometimes survive. It also proves that wounds of the lungs sometimes heal by first intention,[1] and it illustrates a common occurrence after liver wounds, the presence of bile and sugar in the urine. It shows, moreover, that the hepatic peritoneum may be wounded by an arrow without death resulting, or the effusion of blood or bile into the cavity of the abdomen. Finally, it is a good example of the treatment proper in such cases. In this instance, as well as in two of the fatal cases of arrow wound of lung, emphysema was present. It was not particularly treated, save that, when possible, Guthrie's rule was observed, the patient lying on the wounded side.

If an arrow, passing through the lung, lodges in a vertebra, it is very apt to be fatal. For, independent of the danger of a wound of the lung itself, or of laying open one of the great vessels, or of penetrating the spaces between the vertebra, and so injuring the medulla spinalis, there still remains the danger that the head may become detached from the shaft of the arrow, and be left sticking in the bone. The prognosis in all cases must be very guarded.

In addition to the third fatal case of arrow wound of chest before mentioned, we know of four others, not so well authenticated, it is true, but

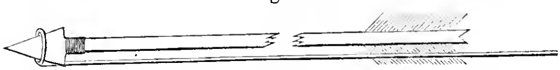
[1] We have noticed in New Mexico a great tendency of all wounds to heal by first intention. In an operation undertaken for the removal of an enchondrome of the vomer, involving a long and disfiguring incision on the face, the wound healed throughout by first intention and scarcely a sign of a cicatrix was left. Assistant Surgeon Irvin has called the writer's attention to the fact that in this country, gunshot wounds sometimes heal in this way, and although we have seen nothing of this kind ourself, we are yet very sure that all wounds heal much more quickly here than at the seaboard. When inflammation does occur it takes a typhoid type. I have not seen a case of sthenic inflammation in the country. It is necessary to remove sutures on the second day. If left longer they slough out. We nearly failed in a case of harelip by neglecting, or rather through ignorance of, this fact.

in which, from a careful inquiry among the friends of the deceased, we were persuaded that death resulted from empyema, the consequence of an arrow-head lodged in the walls of the thorax; we say not well authenticated, because we did not examine the bodies of the wounded men. We have not recorded these among the fifteen cases of wounds of the chest, although there is no doubt that one case out of fifteen is too small a proportion of deaths by empyema.

Let us now inquire into the treatment of an arrow wound of the chest. Take the following case which has occurred in the practice of the writer. I was called to a man shot with an arrow; the shaft was broken off close to the wound, and the splintered ends of the shaft closely resembled a splinter of a fractured rib. As soon as reaction was established (and shock is often severe in arrow wounds of lung) I attempted the removal of the missile, not by catching hold of the broken arrow shaft with strong forceps, and making traction with these, for if I had done so, I would inevitably have left the arrow-head in the wound. The first step in the removal of such a weapon is to ascertain its seat, its connections, its lodgment. First, it is proper to determine how deeply the arrow has penetrated. This can be done by measuring the length of the shaft sticking out of the wound, and deducting this from the total length of an arrow shaft of known length. The Nabajoe and Utah arrow is about two and a half feet long. The Apache, Camanche, Arrapahoe, Cheyenne, Kiowa, and Pawnee arrows are about two feet and three-quarters in length. Next we wish to determine whether the arrow-head is fixed in bone or not. Take the shaft between the finger and thumb, and gently twirl this. If the arrow-head is fixed, we can readily discover the fact by this motion. We then should notice its direction, and whether, considering the depth it has penetrated, it has wounded any great vessel. Here our anatomical knowledge avails us everything. We notice whether blood wells up along the side of the shaft, on pressing this latter aside. We determine whether the head has lodged in a vertebra, or a rib, and if in the last-named, in what rib, and in what part of that rib. We ascertain the exact seat of an arrow lodged in a rib, by first determining the rib, which is sufficiently easy, and then percussing gently the extremity of the arrow shaft with one hand, whilst a finger of the other is gently slid along the wounded rib backwards and forwards, until the point of greatest impact is determined; this is the spot where the arrow-head is lodged. All this having been settled, we may arrive at a prognosis. In the case we have referred to, I went through all these examinations. I found that the arrow shaft broken off, measured two feet and one inch, and I concluded that the lung was wounded to the depth of five inches. (It was a Nabajoe arrow.) The orifice of the wound was in the space between the fourth and fifth ribs, on the right side. The general direction of the shaft seemed to be that of a line drawn from the nipple to the inferior angle of the scapula. On twirling the shaft, by seizing the

broken end of it with tooth-forceps, I found that the point was not lodged in bone. There was no hemorrhage, and the patient rallied from the shock quickly. In this case the prognosis was good, that is, for such a wound. A probe-pointed bistoury was used to enlarge the wound to the extent of an inch, keeping in view the situation of the intercostal arteries, lying as they do on the upper border of the rib in the first two inches of their course previous to their division, and after this division in the larger branch, sheltering itself beneath the lower border of the rib above it; a wire having a loop at the end, and bent at a right angle, was introduced, and pushed down through the wound (using the arrow shaft as a guide), until its loop was past the point of the iron arrow-head, and then slipping the loop over the point of this, and drawing the wire gently back, it was found from the sense of resistance that the loop had snared the treacherous body. Figure 1 illustrates better than words can describe, what is meant.

Fig. 1.



Extraction was of course sufficiently easy. Gentle traction applied to the arrow shaft and to the wire at the same time, sufficed to remove the arrow, without detaching the shaft from the head. The wound was then closed up with collodion dressing, and the patient directed to lie on the wounded side. Inflammation succeeded, but as it was not excessive, I was contented merely with watching it.

Suppose that from the difficulty in breathing, external welling up of blood, and, above all, the depth or direction of the wound, and the continuance of shock, it is made evident that a large vessel is wounded. In such a case there is, of course, no hope. Any interference with the arrow is injudicious, for if we were to extract it under such circumstances, in all probability death would result immediately. We can merely make the patient a little more comfortable in the few hours that are left to him.

If from the depth to which an arrow has penetrated, and from the direction it has taken, and more particularly, if on gently twirling the shaft between the finger and thumb, it is found that the arrow-head has lodged in bone, we must modify our proceeding. The first thing to be done is to determine accurately whether the foreign body has lodged in a vertebra, or in a rib. Here our anatomical knowledge must serve, together with the direction taken by the arrow. Suppose it is lodged in a vertebra, what is to be done? We enlarge the wound, as before ordered, and then very cautiously attempt to loosen the head from the bone in which it is lodged, by gently rocking the arrow shaft, held between the fingers, backward and forward. In what direction is it best to do this, in order not to loosen the head from the shaft of the arrow? If the arrow of any particular Indian tribe is examined, it will be found that the tribe always makes the two

slits in the arrow shaft—the one for the string, the other for the stem of the arrow-head—either in the same plane, or in planes at right angles to one another; most Indians make them in the same plane. Thus the plane of the broad surface of the arrow-head always holds a fixed relation to the plane of the notch for the bow-string. To make this more evident, suppose the head is removed from the shaft of an arrow, and a straight bit of wire put in its place, at right angles to the shaft of the arrow, and another bit of wire laid in the notch for the bow-string; what we intend to state is that these two wires will point in the same direction, or else in a direction at right angles to one another. Before touching the arrow shaft, we notice what the direction of the plane of the notch for the bow-string is, whether it is horizontal or perpendicular, or between these two. We then know that the notch in the other end of the arrow bears a fixed relation to this, and is either in the same plane, or in a plane at right angles to it, according to the way in which the arrow is made by the tribe of Indians to which the arrow belongs.' Having determined exactly what the plane of the notch for the head is, we should now rock the arrow shaft to and fro in a direction at right angles to this plane—the plane of the broad surface of the arrow-head. In this way the chances of loosening the head from the shaft are diminished. There are two places at which yielding may occur; either at the place where the shaft is attached to the arrow-head by the tendon, or else at the place where the head is implanted in the bone. Whatever the theory may be, the practice is to rock the arrow shaft in a plane at right angles to the broad surface of the arrow-head, and not parallel to it. This rocking motion should be both gentle and slight, and may, if these conditions are observed, be persevered in for some time. The Mexicans, in their frequent encounters of the Indians, have become aware of what has just been stated, and they apply it successfully to the extraction of arrows lodged in bone. We know of several instances in which it has been so applied by the Mexicans. Generally, however, it will fail, and if undue force is used the head and shaft of the arrow are sure to become detached from one another. If we succeed, we remove the missile in the same manner as we do an arrow-head not lodged in bone. Supposing, then, we have failed in this plan, what is left us? It will not do to allow the arrow-shaft, head and all, to remain in the wound till it becomes loosened by suppuration. The patient will be sure to perish of pneumonia. We have never had a case of this kind to treat, but have made numerous experiments on the cadaver with various kinds of forceps and other contrivances, and we have come to the conclusion that the following plan will suffice for the removal of arrows lodged in a bone within the cavity of the chest or abdomen most easily to the surgeon and most safely to the patient.

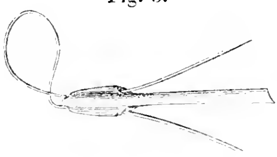
Procure a piece of very well annealed iron wire a little larger than the coarsest usually employed for sutures. Let this be about two feet and a half in length. Pass the ends of this wire through the holes in a very long

Coghill's suture wire twister (Fig. 2), and carry them up the shaft of this, securing their ends to the handle.[1] The loop at the end of the instrument

Fig. 2.

made by the doubling of the wire should now be once twisted on itself and then bent at right angles to the shaft of the instrument. (See Fig. 3.)

Fig. 3.



This shaft should be at least one foot in length. Then, the wound being sufficiently enlarged, we pass the loop at the end of the twister over the feather end of the arrow-shaft, and using this last as a guide, we push the instrument straight on till the loop of wire is carried beyond the arrow-shaft and is encircling the arrow-head. We now draw on one of the ends of the wire so as to make the loop embrace the arrow-head tightly, and then we secure the end of the wire to the handle of the instrument. One or two twists of this will now suffice to tighten the wire, so that it cannot slip off from the arrow-head, and all that is now necessary is to make firm but gentle traction on the handles of the twister, gently rocking the arrow-shaft to and fro at the same time, in order to disengage the head of the arrow from the bone. We have never failed to extract an arrow-head lodged in bone within the thorax by this method. If the arrow-head is very firmly imbedded in the bone it will be well to throw two loops of wire by two twisters over it before making traction. In such a case traction is best made by fastening the handles of the two twisters to an inflexible rod, placing a block or pile of books resting on the patient's thorax under one end of this, and then applying force to the other end. In a word, in such cases it is well to use a lever of the second class to pry out arrow-head, shaft, wire loop, and twister, all together. No forceps ever constructed could be used successfully in such a case. The after-treatment of such cases presents nothing peculiar. The patient must be well guarded against shock.

It is not easy by this method to extract an arrow-head which has passed through one side of the chest and lodged in a rib on the other, although such a wound as this is probably mortal. If the patient survive the shock and hemorrhage, the best plan for extracting the arrow-head is the following: Determine exactly by the process previously given, the part of the rib in which the arrow-head is lodged, then apply the trephine to this part of

[1] A couple of silver catheters straightened and soldered together so as to resemble a large sized double canula for hæmorrhoids will answer in place of Coghill's instrument.

the rib, taking care not to injure the intercostal artery in its lower border. It is very easy to make the opening in the rib within the eighth of an inch of the arrow-head; sometimes we can hit the spot exactly, and on attempting to withdraw the circle of bone we find the arrow firmly imbedded in it. Nothing else is necessary than to cut off the part of the arrow-shaft which protrudes from the right side and draw the remaining portion out through the wound in the rib. But, as was before remarked, the prognosis in every such case is very unfavourable.

Arrow wounds of heart are generally fatal, although not always instantaneously so. In one case falling under my notice the man perished instantly. I found the ventricles of the heart and the descending aorta pierced by an arrow and spiked to a rib. In another case the man lived five minutes. The case was interesting in a medico-legal view, as it was devolved upon us to determine whether the man had been shot with a pistol ball from the weapon of a comrade, or with an arrow, so much did the wound resemble that made by a navy-sized Colt's revolver. I found the arrow-head lodged in a vertebra. It had pierced the top of the auricle.

Arrow wounds of abdomen are generally fatal. An arrow can scarcely pass through the abdomen and fail to open a vessel or wound an intestine. We have seen twenty-one cases of arrow wound of the abdomen. All save one, of those cases in which the abdominal cavity was implicated, terminated fatally. In three the integuments only were wounded, and in one the arrow had lodged in the crest of the ilium without wounding an intestine.

Of the seventeen fatal cases, thirteen perished from peritonitis and four from hemorrhage. All save two were wounded in the intestine, although two of those so wounded died from hemorrhage. Nine of the cases of peritonitis had been exposed to a broiling sun, without water, for two days. Five were dead, and none lived to reach the Post. The remaining four cases of peritonitis occurred in the persons of United States soldiers engaged against Nabajoes. In all, fecal matter was found discharged into the peritoneal cavity, the intestine being wounded.

The Mexicans, on entering into an Indian fight, wrap many folds of a blanket around the abdomen. Thus it happens that an arrow, after penetrating these folds, has not momentum enough left to do more than wound the integument, and fails to reach the abdominal cavity.

From all that has been stated it must appear that the prognosis in all cases of arrow wounds of abdomen is very unfavourable. Much, however, will depend upon the seat and extent of the injury, and upon the facilities for treatment and transportation. The treatment should take into consideration the extraction of the missile, the checking of hemorrhage, the removal of any discharged excrementitious matters, the suturing of the wounded intestine, and the preventing or suppressing of peritonitis. If

the arrow-head is lodged on feces extruded through the wounded intestine, we consider that no surgeon should be satisfied without operating. It is difficult, however, to arrive at this information with certainty.

If called to another case of arrow-wound of abdominal cavity we would feel almost justified in enlarging the wound, laying open the abdomen, searching gently for wounded intestine, and removing the arrow-head if lodged firmly in bone, with strong short forceps. In any event, if this is not done the patient will die. For suturing the intestine we should look upon *very* fine gold wire with great favour; on gold wire because this metal is possessed of greater ductility than any other. If we are certain that an arrow-head has lodged in a bone of the pelvis, the course above indicated must be pursued, for in addition to the facility which an enlarging of the wound gives for extracting the arrow-head, there is thus afforded also an opportunity of suturing intestine requiring it, of removing foreign matters, and perhaps of checking hemorrhage. If it is decided upon to adopt an expectant plan, and, in fact, after any operation for removal of arrow-heads, opium must be given in full doses very frequently, until narcotism ensues, and starvation and absolute rest must be enforced. The patient must not be allowed to rise from the recumbent position for at least two weeks, and milk and light custard must be his only diet. We know of at least one instance in which an officer lost his life by insisting on leaving his bed before the tenth day. In every case, however, of arrow wound of abdomen, it is necessary to remember that the arrow-head must be extracted or the patient will die. It is the great distinctive rule between arrow and gunshot wounds of all other parts of the body as well as of the abdomen, *always to extract the foreign body, if it be an arrow.*

Such, then, are arrow wounds as we have seen them—a class of wounds as troublesome to the surgeon as dangerous to the patient. But in no class of wounds does surgical skill avail the patient so much or reward the surgeon so well for his trouble. Only never let him despair of his patient until he has operated in vain. An expectant treatment in such cases is really no treatment at all.

We wish in conclusion to recommend to those in authority the plan of protecting soldiers and others exposed to arrow wounds with a light cuirass. The Indians have a method of dressing bulls' hide for shields for themselves, which renders it arrow proof. A cuirass made of such material, protecting the whole trunk before and behind, need not weigh more than eight or ten pounds, and by means of it a soldier could enter an Indian fight with a fair chance of escaping death. Or perhaps the recently invented "bullet-proof vests" might be found better adapted to the service and equally effective. Certainly it is policy in fighting any enemy to make it as safe for ourselves as possible, and as dangerous for him. Sooner or later the go-

vernment must undertake some great expedition against all the Indians of the plains. It may be possible to civilize Creeks, Choctaws, Cherokees, etc., but with a Cheyenne or Camanche or Apache the attempt will surely fail. The hands of these Indians ever have been and ever will be against every man. They are the professed exponents and great advocates of barbarism and universal ignorance. In view of any such plan of a general civilization of these tribes we think it should be the care of those who control such things to provide, as far as possible, for the safety of the soldier. We are certain that if suitable bulls' hide cuirasses were provided fatal wounds from arrows would become very rare. In all commands engaged against Indians an order should be issued warning the men of the danger of attempting to extract an arrow, and directing them in all such cases to go at once to the surgeon in attendance for assistance. From what has been already written, it is easy to see how great an advantage such a course will give a surgeon in the treatment of the injury.

FORT CRAIG, NEW MEXICO, Jan. 1, 1862.

ART. III.—*Inoculating the Human System with Straw Fungi, to protect it against the Contagion of Measles: with some Additional Observations relating to the Influence of Fungoid Growth in producing Disease and in the Fermentation and Putrefaction of Organic Bodies.* By J. H. SALISBURY, M. D., of Newark, Ohio.

IN the July number of this *Journal*, I presented some remarks on fungi, with an account of experiments showing the influence of straw fungi upon the human system, etc. At that time I had inoculated but thirteen cases. Since then there have been inoculated 27 additional cases, all of which were situated under the most favourable circumstances for testing rigidly the prophylactic virtues of inoculation with straw fungi, in protecting the human system from the contagion of measles.

About the 30th of May, 1862, measles made their appearance among the boys of the Ohio State Reform Institution, situated in Fairfield County, Ohio. They were introduced into the establishment by a boy who was taken into it before he had entirely recovered from the disease. The officers in charge were not acquainted with the fact till it was too late to remedy it.

June 2d, Drs. Effinger and Boerstler, of Lancaster, O., were called to examine the first cases. They at once pronounced the disease measles. June 4th, I received the following letter from Dr. Boerstler.

LANCASTER, June 2d, 1862.

My dear Sir: Sorry you have left. To-day was called in consultation, to Reform Farm, where they have 175 boys, twelve taken down with

rubeola, many more to take it. I hunted the farm over for fungi. No straw. Got very poor mould of clover. Had Dr. Effinger to introduce it into three boys, all of whom sleep in the room where those do who have the disease. No better opportunity to test; I wish I only had good fungi from straw. Will hunt it up, and try fairly. I wish you were here to experiment for weeks. Will give you the desired information as soon as at leisure.

I am truly yours,

Dr. J. H. SALISBURY, Newark, O. BOERSTLER.

On June 5th, I started for Lancaster, and arrived there about noon. Saw Dr. Boerstler, and made arrangements to visit the State Farm with Drs. Effinger and Boerstler on the following morning, June 6th. I had with me mould from wheat and rye straw which was grown in a box in my office. The fungi were grown about three weeks previously, and had been left in the box—in a mature state—upon the straw. The whole plants with the spores were carefully removed from the straw and placed between plates of glass on the 3d of June.

On the morning of June 6th, we repaired to the State Farm. Professor Howe, principal of the institution, had kindly extended to Dr. Effinger, the attending physician, and Dr. Boerstler every facility the case in hand afforded for testing the prophylactic virtues of straw fungi in protecting the human system from the contagion of measles.

We accordingly selected twenty-six fine healthy boys, who had never had the disease, and inoculated them. There were 175 boys in the institution, ranging in age from eleven to sixteen; and these were divided into four families, each family occupying a building by itself. In each building was one large sleeping room, in which all of a single family slept. Cases of measles had occurred in every family, exposing every boy in the establishment to the contagion of the disease. Twelve boys had already had the measles, and were so far recovered as to be out, and six were still in bed with the disease.

Cases Inoculated.—CASE I. Fred. Abraham (Cuyahoga family).

June 6. Inoculated with rye straw fungi.

9th. Redness of inoculating wound slight. Blotch two lines in diameter; no red lines radiating from wound.

12th. Blotch dried. Well.

15th, *16th*, *19th*, and *24th*. Well.

July 22*d*. Has had no symptoms of measles.

CASE II. Albert Kelso. (Cuyahoga family.)

June 6. Inoculated with fungi of rye straw.

9th. Redness slight. Blotch four lines in diameter; red lines radiating from the wound. Eyes slightly vascular.

12th. Blotch dried; had cough and coryza.

15th, *16th*, *19th*, and *24th*. Well.

CASE III. Silas Pond. (Scioto family).

June 6. Inoculated with fungi of rye straw.

9th. Well, and out with force; was not seen.
12th. Well; out with force; was not seen.
15th. Well. Blotch dried.
16th, 19th, and *24th.* Well.

CASE IV. Edward Blakeley. (Scioto family.)
June 6. Inoculated with fungi of rye straw.
9th. Inoculating wound red. Blotch four lines in diameter; red lines radiating from wound.
12th. Well; out with force; was not seen.
15th. Blotch dried and well.
16th, 19th, and *24th.* Well.

CASE V. August Gibing. (Scioto family).
June 6. Inoculated with fungi of wheat straw.
9th. Redness slight; no red lines radiating from the wound.
12th. Well; out with force; not seen.
15th. Well; blotch dried.
16th, 19th, and *24th.* Well.

CASE VI. Levi Wilson. (Hocking family).
June 6. Inoculated with fungi of wheat straw.
9th. Well; out with force; was not seen.
12th. Well; out with force; was not seen.
15th. Well; blotch dried.
16th, 19th, and *24th.* Well.

CASE VII. Thomas Collins. (Cuyahoga family).
June 6. Inoculated with the fungi of wheat straw.
9th. Working well; blotch four lines in diameter; red lines radiating from the wound.
12th. Blotch dried and well.
15th. Well; at work with the force; not seen.
16th, 19th, and *24th.* Well.

CASE VIII. Barner Greener. (Cuyahoga family).
June 6. Inoculated with fungi of wheat straw.
9th. Doing well; blotch four lines in diameter; red lines radiating from the wound.
12th. Well; working with the force; not seen.
15th. Well; blotch dried.
16th, 19th, and *24th.* Well.

CASE IX. James Hill. (Scioto family).
June 6. Inoculated with fungi of wheat straw.
9th. Blotch the size of a five cent piece. Red lines radiating from the wound.
12th. Well; working with the force; not seen.
15th. On the night of the 12th an eruption appeared in patches on his arms; it appeared next on his face; next on his legs and thighs; and lastly on his breast; sickness slight.
16th. The blotches were about one line in diameter, circular, and about half an inch apart. They were distributed in patches over the whole body. The eruption was still plainly visible on the face and body. There was no smell whatever to the disease. Sickness slight from the commencement.
19th and *24th.* Well, and working with force.

CASE X. George Brown. (Scioto family).
June 6. Inoculated with fungi of wheat straw.
9th and *12th*. Well; working with force; not seen.
15th. Well; blotch dried.
16th, *19th*, *24th*. Well.

CASE XI. Joseph Townsend. (Scioto family).
June 6. Inoculated with fungi of wheat straw.
9th. Blotch small; slight red lines radiating from the wound.
12th. Blotch dried; had some cough and coryza.
15th, *16th*, *19th*, and *24th*. Well.

CASE XII. Miles Parmeter. (Cuyahoga family).
June 6. Inoculated with fungi of wheat straw.
9th and *12th*. Well; working with force; not seen.
15th. Well; blotch dried.
16th, *19th*, and *24th*. Well.

CASE XIII. John Lawrence. (Scioto family).
June 6. Inoculated with fungi of wheat straw.
9th. Doing well; blotch four lines in diameter; red lines radiating from the wound. Eyes vascular.
12th. Well; working with field force; not seen.
15th. Well; blotch dried.
16th, *19th*, and *24th*. Well.

CASE XIV. Thomas J. Fransted. (Scioto family).
June 6. Inoculated with fungi of rye straw.
9th. Blotch looks well; size of a three cent piece; red lines radiating from the wound; eyes sensitive.
12th. Well; working with force in field; not seen.
15th. Well; blotch not quite dried.
16th, *19th*, and *24th*. Well.

CASE XV. George Nestine. (Muskingum family).
June 6. Inoculated with fungi of rye straw.
9th. Working, well; blotch 4 lines in diameter; red lines radiating from the wound; eyes vascular.
12th. Well; working with field force; not seen.
15th. Well; blotch dried.
16th, *19th*, and *24th*. Well.

CASE XVI. James Galvin. (Muskingum family.)
June 6. Inoculated with fungi of rye straw.
9th. Blotch looks well; 4 lines in diameter; red lines radiating from the wound.
12th. Well; working with field force; not seen.
15th. Blotch dried; has cough and coryza.
16th. Has cough and coryza; slightly sick; in bed for 24 hours; no blotches.
19th. Well. Has had no blotches. Was well and out working with the force on the 17th.
24th. Well.

CASE XVII. John Boyd. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Blotch looks well; size of a three cent piece; red lines radiating from the wound; eyes vascular.

12th. Well; working with the force; not seen.

15th and *16th.* Has cough and coryza; fever; headache; lassitude; slightly sick; no eruption. Was in bed 1½ day.

19th and *24th.* Has been well since the 17th, working with the field force.

CASE XVIII. George Harmis. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Blotch 4 lines in diameter; red lines radiating from the wound; eyes vascular.

12th. Well; blotch dried.

15th, 16th, 19th, and *24th.* Well.

CASE XIX. Edward Smith. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Blotch 3 lines in diameter; red lines radiating from the wound.

12th. Well; working with field force; not seen.

15th. Well; blotch dried.

16th, 19th, and *24th.* Well.

CASE XX. Jacob Myres. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th and *12th.* Well; working with field force; not seen.

15th. Well; blotch dried.

16th. Headache; some fever; cough and coryza; in bed for 1 day; no eruption.

19th and *24th.* Has been well and working with the force since June 17th. Has had no eruption.

CASE XXI. Wm. Dayton. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Blotch looking well; 3 lines in diameter; red lines radiating from the wound; eyes vascular.

12th. Well; working with field force; not seen.

15th. Well; blotch dried.

16th, 19th, and *24th.* Has been well since the 15th. No signs of measles.

CASE XXII. Charles Ryan. (Muskingum family.)

June 6. Inoculated with rye straw fungi.

9th. Blotch small; slight red lines radiating from wound.

12th. Well; blotch dried.

15th and *16th.* Coughing and coryza; with pains in head.

19th. Broke out with what was supposed to be measles; eruption was not carefully examined; was not much sick; this is a scrofulous subject and has sore eyes.

24th. Well; and working with force.

CASE XXIII. Milan Goldsboro. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Blotch three lines in diameter; red lines radiating from the wound; eyes vascular.

12th. Well; blotch dried.

15th, 16th, 19th, and *24th.* Well; no symptoms of measles yet.

CASE XXIV. Beaumont Byers. (Muskingum family.)

June 6. Inoculated with the fungi of rye straw.

9th. Blotch four lines in diameter; looks well; red lines radiating from the wound; eyes vascular.

12th. Well; blotch dried.

15th, 16th, and *19th.* Well; working with field force; not seen.

24th. Eruption first noticed on face, breast, and arms June 21st. June 24th, eruption declined, leaving obscure blue blotches over whole body; eyes red; some cough and coryza; sickness slight.

CASE XXV. Wm. Hancock. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Blotch looks well; three lines in diameter; red lines radiating from the wound; eyes vascular.

12th. Well; blotch dried.

15th and *16th.* Well; working with field force.

19th. Eruption appeared first on the 17th on the face; 18th and 19th broke out on body; eruption is in patches; but slightly sick.

24th. Well; working with field force.

CASE XXVI. Vinton Ryder. (Muskingum family.)

June 6. Inoculated with fungi of rye straw.

9th. Working well; blotch three lines in diameter; red lines radiating from the wound.

12th. Well; working with field force; not seen.

15th and *16th.* Well; blotch dried.

19th and *24th.* Well; working with field force; no symptoms of measles yet.

CASE XXVII. John Tully.

June 9. Inoculated with fungi of rye straw.

12th. Well; working with field force; not seen.

15th. Well; blotch dried.

16th, 19th, and *24th.* Well; no signs of measles yet.

Visited the institution again with Dr. Effinger July 22d. The measles had all disappeared some ten days previously. About fifty cases of the disease had occurred in the establishment since June 24th, but none of them among the twenty-seven boys that were inoculated. They had all been well, though constantly exposed to the contagion. The red lines radiating from the inoculating wounds could not be well seen without the aid of an eye-glass.

June 9th, three days after the inoculation, Dr. Boerstler and myself saw the cases and inoculated another boy. None had symptoms of measles.

June 12th, Drs. Effinger and Boerstler saw the cases and made the report of that date.

June 15th, Dr. Effinger saw the cases and reported their condition. One of the boys, James Hill, was broken out and in bed. The eruption first made its appearance upon the night of the 12th of June. Dr. Effinger

did not notice the case very particularly; he only observed that he was broken out, and not very sick.

June 16th, I saw the cases. None of those who had been inoculated were broken out, except James Hill, noticed by Dr. Effinger on the 15th. The blotches, which had not yet disappeared from his face, were about one line in diameter, circular in form, and scattered in patches over the whole body. The individual blotches were about one-half an inch apart. There was no odour whatever to the disease. The eruption made its appearance first in irregular patches, on the arms; next on the face; then on the legs and thighs; and lastly, on the breast. The blotches were small, circular, and in patches over the whole body; sickness slight.

I do not look upon this case as one of genuine measles; it may have been the disease, modified by the inoculation. This can only be settled by further experience in similar experiments.

June 19th, Dr. Effinger saw the cases and made the report of that date. Two more cases, Charles Ryan and Wm. Hancock, were broken out. Wm. Hancock broke out on the 17th on his face, and on the 18th and 19th on the body; eruption in patches. Charles Ryan broke out on the 18th and 19th. He is scrofulous, and has chronic sore eyes.

June 24th, Dr. Effinger saw the cases and reported one more boy, Beaumont Byers, down with what appeared to be measles. June 21st, the eruption was first noticed on face, breast, and arms. On the 24th it had declined, leaving obscure blue blotches over the whole body. Some cough and coryza, and eyes red.

Several of the boys (as will be seen by reference to the notes) who were inoculated, were affected, between the appearance of the eruption on James Hill and that on Beaumont Byers, with headache, cough, coryza, and lassitude, so that they took to their beds for from one to two days; but there was no eruption, and but slight fever. The four cases where eruption occurred appeared to be modified types of the disease.

The institution being some seven miles from town, and no physician on the ground, the cases where eruption occurred could not be studied sufficiently in detail, so as to determine whether they presented marked peculiarities in type, to indicate the degree that the inoculation had modified the disease.

It is through the efforts and kindness of my learned friends Drs. Boerstler and Effinger, of Lancaster, Ohio, that I am able to present so fine a list of cases, all occurring under such favourable circumstances, for testing the virtues of straw fungi as a prophylactic in measles. I am under obligations to them for their interest, zeal, and valuable labours in these experiments.

Dr. Boerstler reports the following, which he received at the Ohio State Medical meeting at White Sulphur Springs, June, 1862, from his friend, Dr. Gordon, of Georgetown, Brown County, O. "Dr. Gordon has visited

ninety military camps, and states that rubeola originated and existed in every instance where the soldiers slept upon damp straw; and so far as he knew, not a solitary case of rubeola occurred in any camp where the soldiers did not sleep upon straw."

In the year 1847, rust attacked the wheat crop quite generally throughout Central Ohio. Mrs. J. J. Brasee, of Lancaster, Ohio, states that one Henry Bowers worked as a farm hand for her husband, Hon. J. T. Brasee, during that year; and that during wheat harvest, he (Bowers) was affected with sore throat, cough, sore eyes, headache, high fever, red face and a feeling of weariness and depression. Upon Mrs. Brasee asking him what was the matter, he (Bowers) stated that he had been working in the wheat field, harvesting; and that his sickness was produced by the rust on the wheat. That others working with him were affected in the same way.

The following interesting letter is from Dr. Boerstler.

LANCASTER, June 10, 1862.

Dr. Salisbury—Dear Sir: In compliance with your request, I make the following statement: In my native county of Washington, Maryland, the hay and grain harvest usually lasts from four to six weeks, and attracts from the mountain regions a thousand labourers. During the harvest of 1828 or 1829, the year I do not distinctly remember, we had rust in a number of wheat fields, and amongst the harvesters in those fields, the measles appeared. The occurrence of measles in midsummer is very unusual, unless the contagion has been transmitted from early spring. We had, previous to harvest, no measles in the county, and no cause could then be assigned. Since the fungoid theory has been broached, is it not probable that the rust on the wheat may have produced the disease? This is a subject of deep interest, and you have my thanks for your persistent efforts in its prosecution.

I am, dear sir, respectfully yours,
G. W. BOERSTLER, M. D.

In Berkeley's able work on *Cryptogamic Botany*, it is stated that in reed beds (South) where the stems are affected with a rust or fungous growth, (ustilago Typhoides) the workmen suffer from headaches and other bad symptoms, in consequence of inhaling the abundant spores. On account of the peculiar symptoms produced (of a typhoid character), it has received the specific name Typhoides. This fungus comes under the group *Coniomycetes*. The parasitic rusts and mildews come under the same group.

It is an interesting fact that in those regions where the atmosphere is dry and rain seldom falls, organic decay and fermentation are tardy and imperfect, fungi are not produced and lung diseases are unknown, except as importations. Diseased lungs are quickly restored to health. All meats are cured by jerking (cutting in strips and drying); and dead bodies become soon dry and mummified, without being affected with decomposition.

I am engaged in some experiments which will soon be ready for the press, connected with fermentation, decay, and fungoid development, which throw interesting light upon this matter.

Art. IV.—*Cases of Opium Poisoning treated by Belladonna, with Remarks.* By William F. Norris, M. D., Resident Physician to the Pennsylvania Hospital.

Case I. ——, aet. 19, druggist, was admitted into the Pennsylvania Hospital Feb. 21st, 1862. On the morning of the 21st he came to the shop of his employer as usual, where he remained till after 10 o'clock, when he went to Rosengarten & Son's chemical works, and there purchased an ounce of the sulphate of morphia. He then walked into the outskirts of the city where he obtained some water, poured it into the bottle containing the morphia, and after having swallowed a large mouthful, recorked the bottle and put it into his pocket. This bottle was subsequently obtained by his employer, who carefully evaporated the contents to dryness, and found seventy-five grains missing from the ounce. The patient insisted that none of the contents of the bottle had been spilled. He afterwards wandered about the town for an hour and a half, when he began to feel tired and sleepy, and being near a friend's house, went in, stating that he had poisoned himself, and that he wished an interview with his sister before he died. He now appears to have become frightened at the step he had taken, and a few minutes after, although he was very sleepy, and his gait staggering, walked to a neighbouring drug store, and obtained and swallowed two drachms of tannic acid, with a view of counteracting the effects of the morphia. His friends being much frightened, at once sent for his employer, who soon arrived and administered a quantity of sulphate of zinc. Dr. W. F. Atlee, a short time after, repeated the dose which then caused free emesis. He also gave a strong decoction of coffee with two grain doses of Squire's extract of belladonna, in solution, which were repeated at short intervals, until in about an hour he had taken twenty grains of the extract. When admitted into the hospital at 2.15 P. M. his pupils were contracted to a pin's point, his pulse 80 and soft, his gait staggering; slow of speech, although if sharply questioned, he would answer his name. He complained of thirst, and would sleep even when standing up if those supporting him did not keep him constantly in motion. He was at once sent into the garden, where two attendants kept him walking briskly. Ten grains of Herring's extract of belladonna in solution were then administered, and this was repeated in half an hour (3 o'clock). The pulse had now risen to 100, but the pupils were still excessively contracted, his intellect was, however, more active, and he now gave a tolerably clear account of himself, complaining of thirst. At 3.30 the pupils were beginning to dilate, though he continued still very drowsy. At 3.45 his condition remaining unchanged, the pupils continuing about the same size, and no flush of the face being perceptible, ten grains more of the extract of belladonna in so-

lution were given, making in all fifty grains, thirty of which were given after his entrance into the hospital. At 4.5 there was a marked change for the worse; he could no longer support his own weight, and the attendants who had charge of him dragged him along; his pulse was 120, and his pupils widely dilated. He was now carried up stairs, stripped and put under a cold shower bath, which revived him so much that he struggled strongly to get away; he was rubbed briskly with coarse towels till dry and the skin red. The good effects of the bath were but transient, for even before he was thoroughly dried, drowsiness again overtook him, and vigorous shakings with repeated attempts to make him walk entirely failed. He was therefore placed in bed. His respiration was laboured and very slow. At this period Dr. F. G. Smith, the attending physician, saw him, and directed the application of the galvanic battery, one pole being placed over the cervical vertebræ, and the other over the diaphragm. It was then attempted to cause him to swallow some brandy with two grains of sulphate of quinia in solution, but this failed, a portion running into the larynx and exciting cough. Half an ounce of brandy was then given by injection, and at the same time mustard plasters were applied to the abdomen and inside of the thighs. Under the action of the battery the frequency of the respiration was much increased.

At 5.30 the pupils were fully dilated, respiration 11 per minute, pulse 112, capillary circulation more active, and a slight red flush of the face showed the full action of the belladonna. The injection of brandy was repeated at 6.30 and 7.30, but there was no material change in the symptoms. At 8.30 the pulse was found to be more feeble, the lips bluish, and respiration more laboured. The temperature of the surface was not much reduced. The galvanic battery was now reapplied, and under its influence the number of respirations rose to 13 per minute; this was followed by an injection of brandy, and sulphate of quinia. At 9.45 the injection was repeated; he then opened his eyes and looked around, but would not answer when spoken to, and soon relapsed into his comatose condition. His pupils continued dilated, and did not contract under the influence of light. Respirations were 12 to the minute and not quite so stertorous. Pulse 114 and stronger, the skin was warm and the flush had disappeared from the face. The mustard plasters having acted well had been transferred to the back and chest, where, having thoroughly reddened the skin, they were now removed. At 11.30 the skin was warm, lips red, pupils still dilated, and immovable, breathing stertorous, 10 per minute. The battery was again reapplied and the number of respirations increased to 12, pulse 108. He roused up and made some resistance during the application of the battery, mumbling, "What are you about?" but at once on cessation of the current dropped off into stertorous slumber. At 1 o'clock A. M. he had so far recovered that the nurse was unable to give him his injection on account of his violent resistance; he refused to take anything unless he could see the

Doctor's prescription for it. At 2 he was able to talk, and promised to swallow the medicine which was directed for him. The nurse reports his having vomited a dark-coloured liquid during the last hour, his pupils are still dilated and immovable, pulse 114, respiration 12 per minute. Half an ounce of brandy was now given him by the mouth, and a wine-glass of milk punch was ordered for him at 3 and 5. His respiration continued stertorous. At 8 o'clock he was awake and rational, his pupils somewhat dilated, pulse 114, full and strong, respirations 16 to the minute, easy and natural. At 9.30 his condition was much the same, his bowels, however, had been moved, the evacuation being normal in character. He has also had much bilious vomiting, to relieve which, he took lime-water and milk. At dinner time he took some beef essence, which he retained, and has had no vomiting since. His skin was still considerably reddened from the application of the mustard. From this period he continued steadily to improve, and on the next day had regained his usual health and appetite.

Case II. J— K—, æt. 55, was admitted into the Pennsylvania Hospital on the 24th of March, 1862. He had two small superficial wounds in the neck, and a larger one at the bend of the left elbow, exposing, but not wounding, the median cephalic and basilic veins. He was brought into the house about 5 o'clock P. M., surly, and rather soporose, with a weak pulse. It was stated that his wounds were the result of an attempt at suicide at his place of business early in the morning, and that not succeeding in this, he had at about 9 o'clock swallowed the contents of an ounce phial of laudanum. An emetic was at once administered to him, consisting of thirty grains of sulphate of zinc with an ounce of the wine of ipecacuanha, followed by a small quantity of warm water. In about three-quarters of an hour this produced slight vomiting. At 6 o'clock five grains of the extract of belladonna in solution were administered. This was repeated at 7 o'clock, at which period no change was remarked in his condition, except that he had become more sleepy, and could be kept awake only by having an attendant constantly to shake and talk to him. An hour later (8 o'clock) he had become still more sleepy, and the dose of belladonna (five grains) was repeated, but it was with great difficulty that he could be made to swallow it; he would put it to his lips, and before he had swallowed more than a few drops, would again fall asleep. At half past 8, his attendants were unable to keep him awake. At 9, his pulse was very feeble and rapid, his breathing stertorous, his pupils—as had been the case from the time of his admission—contracted, but not to a pin's point. Two grains and a half more of the extract of belladonna were now administered, large mustard plasters were applied to the front of the chest, and he was subjected to a strong current of electricity from an electro-magnetic battery, one pole being placed over the diaphragm, the other on the cervical vertebræ. His pupils had now become dilated, showing the full action of the belladonna. Notwithstanding

these remedies, his respiration grew slower; at 10, the pulse at the wrist could not be felt (auscultation over the heart, however, showed it to be 120). A little later, even under the stimulus of the battery, his respirations were only seven per minute. Artificial respiration was now employed, causing expiration by pressure on the anterior part of the thorax, and allowing inspiration to take place through the natural resiliency of the parts. Small doses of whiskey, frequently repeated, were administered. It was with great difficulty, however, that he could be made to swallow it. Under this treatment he slowly improved; at 2 o'clock A. M. his pulse was 120, and could easily be felt at the wrist; respiration still stertorous, sixteen to the minute. At 4, 8, and 9 o'clock no change was noted, except that his pupils were less dilated than they had been the night before. At the latter hour, milk-punch every half hour, with 20 ♏ spts. ammoniæ aromat. was ordered. His condition remained much the same up to 12 o'clock, when he suddenly sank, and a few minutes after expired. No post-mortem examination could be obtained.[1]

The first of the preceding cases presents several points of interest. 1st. The length of time which intervened between the taking of so large a quantity of morphia, and the appearance of the symptoms, which mark the second or soporose stage of the action of that drug. 2d. The recovery of the patient after taking so large a quantity of the poison. 3d. The action of the belladonna.

I. *The length of time which intervened between the taking of the large dose, and the appearance of the symptoms.*—In regard to the first point, Mr. Taylor, in his work on *Poisons,* remarks: "When any one of the salts of morphia is taken at once in an overdose, the symptoms are strongly marked, and they follow each other more speedily. They generally commence in from five to twenty minutes after the poison has been swallowed."[2] Although this be the rule, yet the volume of the same author furnishes a remarkable exception to it, for at page 547, he relates the case of M. Bonjean, who swallowed fifty-five grains of the acetate of morphia, dissolved in an ounce of water, in whom "no symptoms of any importance manifested themselves until an hour after the poison was taken, and then there was simply giddiness, with a tendency to sleep. Two hours after the occurrence, he had still the power to answer questions! In four hours, deep coma supervened."

Christison quotes a case from Orfila where twenty-two grains of the muriate of morphia were taken, in which four hours elapsed before the patient first felt approaching stupor.[3] Half an hour later he could still answer questions, although he could not see the interrogator. This de-

[1] I am indebted to my colleague, Dr. John Ashhurst, for the notes of this case.

[2] Taylor on Poisons, Philadelphia, 1859, p. 544.

[3] Christison on Poisons, Philadelphia, 1845, p. 558.

layed action is seen in other preparations of opium, and the same author relates the case of an habitual drunkard, who swallowed two fluidounces of laudanum, "while intoxicated to excitement from beer and spirits," where no material stupor appeared for five hours. He also adduces a case taken from Corvisart's Journal, where two and a half fluidounces of laudanum, with one drachm of extract of opium (*i. e.*, 213½ grs. of opium) were taken, without producing well-marked stupor till after the lapse of more than an hour.

II. *The recovery of the patient after so large a dose.*—The largest recorded dose of any of the salts of morphia from which any patient has recovered, that I have been able to find, is the case of M. Bonjean (above quoted) who took fifty-five grains of the acetate of morphia in solution. Taylor also gives a case where fifty grains of the same salt were taken on an empty stomach, and another where twenty grains were swallowed, both of which recovered. *Christison* (pp. 558–559) mentions an example of recovery from twenty-two grains of the muriate of the same alkaloid.

III. *The action of the belladonna.*—Belladonna, under the different names of στρυχνος μανικος, solanum furiosum and belladonna, has been described by both ancient, mediæval, and modern writers. As it is an ornamental plant, growing in temperate climates, and having berries which possess a sweetish taste, there have been many cases of poisoning by it reported, principally from the accidental eating of the berries; and the symptoms of poisoning from its use seem to have been almost as familiar to the old authors as to us of the present day. A knowledge of the antagonistic powers of opium and belladonna seems also to be of early date. Pena and De Lobel, in their work entitled *Stirpium Adversaria Nova,*[1] so early as 1570, give an account of Italian peddlers who excited the wonder of the common people by giving, to alleviate thirst, portions of the root of the belladonna, the evil effects of which were averted either by vinegar, wine, or theriaca.[2] In 1661, Horstius, in his *Opera Medica,*[3] relates the case of a man who swallowed a spoonful (*cochleare plenum*) of the inspissated juice of the belladonna, by mistake for rhob. sambuci. This was followed by dimness of vision, dryness of the throat, delirium, and tremors, from which he is stated to have recovered, after taking

[1] Stirpium Adversaria Nova, authoribus PETRO PENA, et MATHIA DE LOBEL, Medicis. Londini, 1570, p. 103.

[2] Theriaca was frequently administered by the old authors as a specific in all cases of poisoning; thus Prosper Alpinus remarks: "Omnes affirmant theriacam illam (viz., Egyptiorum), vim efficacissimam habere adversus omnia venena."—Prosper Alpinus, De Medicina Egyptiorum, lib. iv. p. 308. Lugdini, Batavorum, 1718. Giacomini also quotes him as stating that opium, combined with belladonna, weakens the action of the latter.

[3] Opera Medica, tom. ii., lib. 10, p. 515. Gouda, 1661.

theriaca, with the juice of rue. In the work of Faber on *Strychnomania*,[1] published in 1677, thirteen cases in which belladonna berries were swallowed, are recorded; of these, two escaped without any unpleasant symptoms, but the remaining eleven were affected with delirium, dimness of vision, difficulty of swallowing, and a number with redness of the skin. Out of this number, there were two deaths; in both the delirium passed away, and coma preceded death. The treatment in ten of these cases consisted chiefly of theriaca, with adjuvants, which varied more or less in each case.[2] He also quotes a case from Brotbequius, a contemporary, of a similar kind, in which recovery took place after the exhibition of opium.[3] In 1766, M. Boucher, of Lille,[4] published five cases of poisoning by belladonna berries; his treatment consisted chiefly in the administration of emetics, purgatives, enemata, and vinegar; the latter he looked upon as an antidote to belladonna. In two cases, however, one of which was in a state of coma, and the other delirious, preparations of opium were administered. I have not been able to find any further reference to the subject until 1810, when Joseph Lipp published an inaugural dissertation, entitled "*De veneficio baccis belladonnæ producto atque opii in eo usu.*" This paper I have been unable to consult, but Giacomini,[5] in his *Traité de Matière Médicale et de Thérapeutique*, states that in it are recorded several cures by means of Sydenham's laudanum. The latter author, in his article on opium remarks that it has constantly been found useful in the treatment of poisoning by hyoscyamus, stramonium, and belladonna, and asserts "*Les Italiens ont donné dans ces cas l'opium a haute dose et ils ont vu la stupeur, le délire et les convulsions disparaitre.*"[6] In a paper read before the Physiological Society of Edinburgh, by Dr. Thomas Anderson, in 1854, he remarks that, following out the suggestion of Dr. Graves, that an agent which would dilate the pupils might be administered with advantage in cases of coma with contracted pupils, in low fevers, it occurred to him to use belladonna in opium poisoning, and he there details two cases successfully treated by it.

From this period up to the present time, there have been numerous cases reported in the journals, both of opium poisoning, treated by belladonna, and belladonna poisoning, treated by opium. Of such of these as I have been able to collect details, I subjoin the following tabular list.

[1] Strychnomania explicans strychni manici antiquorum vel solani furiosi recentiorum historiæ monumentum, indolis nocumentum, antidoti documentum, etc., by Johannes Matth. Faber, August. M. D. Augustæ Vindelicorum, 1677.

[2] Ibid., pp. 4–18.

[3] Ibid., pp. 25 and 26.

[4] Journal de Médecine, Chirurgie et Pharmacie, etc., tom. xxiv. Janvier, 1776, pp. 310—332.

[5] Giacomini, Traité de Matière Médicale et de Thérapeutique, Paris, 1839, p. 537, published in the Encyclopédie des Sciences Médicales.

[6] Ibid., p. 70.

Cases of Opium Poisoning treated by Belladonna.

Amount of opium.	State of patient.	Age.	Amount of belladonna administered.	Results.	Authority.
Sol. morph. muriatis f℥ij (Ed.) (about 9 grains) in 36 hours.	The patient previously labouring under delirium tremens, now fell into profound coma, breathing 4–5 per minute, stertorous; pupils contracted to mere points; the pulse excessively weak and slow.	Not g'n.	Tinct. belladonnæ fʒvj; a dose of a fluidrachm, repeated every half hour.	Recovered from the effects of opium but died 3 days afterwards from exhaustion on sudden rising. Coma had disappeared in 4½ hrs. after the first dose of belladonna.	Anderson, Edin. Journ. Med. Sci., 1854, p. 377–378.
Tinct. opii fʒv. (Ed.) about 23 4-10th grs. of opium, in an hour and a half.	Entirely comatose; pupils contracted to mere points; respiration stertorous, 10 per minute; the pulse feeble and extremities rather cold.	50	Tinct. belladonnæ fʒj–fʒij; in the course of an hour.	In 5 hours, "all indications of opium poisoning had disappeared."	Loc. cit.
Tinct. opii f℥j, *i. e.* 37½ grains of opium.	Comatose; respiration stertorous; pulse feeble, and 50 per minute; surface cold and pupils contracted to a mere speck.	24	Extr. belladonnæ gr. vij. Tr. do. f℥j.	Complete recovery.	Mussey, Bost. Med. & Surg. Journ. vol. liv., 1856, p. 56, from Cincinnati Med. Obs.
Tinct. opii f℥ij, *i. e.*, 75 grains of opium.			Tinct. belladonnæ f℥ss, as injection per rectum.	Cured.	Comégys, Ranking's Abstract, vol. xxxiii., p. 280, from Cincinnati Lancet.
Unknown.	Profound coma; skin pale, cold, clammy; pulse feeble, 40 per minute; respiration slow and "laborious; pupils excessively contracted."	2	Tinct. belladonnæ ♏60; in dose of 15♏ repeated every 20 minutes.	Perfect recovery in 2 hours.	Lee, Amer. Journ. Med. Sci., Jan., 1862, p. 57–58.
Tinct. opii f℥jss, about 56¼ grs. of opium.	Deeply comatose; pupils contracted "to a pin's head size."	Not g'n.	Tinct. belladonnæ fʒxjss; in less than three hours.	Rapid and perfect recovery.	Motherwell, Med. Times and Gazette, Jan 4. 1862, from Australian Med. Journ. Oct., 1861.
Sydenham's laudanum (quantity unknown.)	Somnolence followed by vomiting, which was very distressing.	40	Hydro-alcoholic extract of belladonna two centigrammes (about 3-10ths of a grain.)	The vomiting was promptly checked, and all traces of poisoning disappeared.	Béhier. Ann. de Thérapentique, 1860, pp. 18–19, par A. Bouchardat.
Decoction containing two poppy heads.	Constant somnolence; malaise: nausea; vomiting; face pale: pulse small; skin cool; pupils contracted.	51	One centigramme of the hydro-alcoholic extract of belladonna (about 16-100th gr.)	Cure.	Béhier, Loc. cit. p. 19–21.
Tinct opii f℥ij (*i. e.* 75 grains of opium).	An hour and a half after taking the opium, she had a flushed face; pulse 70; contracted pupils: stertorous breathing; could be roused with great difficulty; was given an emetic which brought up dark liquid smelling of laudanum; 5 hours after taking laudanum was insensible to external impressions; pupils excessively contracted; surface cold and clammy; unable to swallow; countenance pale; pulse thready and feeble, almost imperceptible.	38	Tinct. belladonnæ f℥j (by the mouth); Extr. belladonnæ gr. xx, in solution, by the rectum within 17½ hrs.	In 27½ hours after taking the laudanum she had entirely recovered.	Duncan, Am. Journ. Med. Sci., July, 1862, p. 277–8.

Amount of opium.	State of patient.	Age.	Amount of belladonna administered.	Results.	Authority.
Tinct. opii fʒj (*i. e.* 4$\frac{5}{8}$ grains of opium.)	Not capable of being roused; breathing heavily; pupils contracted to a point; skin warm; pulse 100, small; incapable of swallowing. (The child was convalescing from an attack of pneumonia following measles.)	4	18 drops of Thayer's fluid extract of belladonna, in dose of 2 to 3 drops, by the rectum.	Died in about 13 hrs. after taking the laudanum; asphyxiated from the collection of mucus in the bronchial tubes. The child had exhibited marked improvement after each dose of belladonna, and shortly before death all symptoms of opium poisoning "were entirely relieved."	Blake, Am. Journ. Med. Sci., July, 1862, p. 280–281, from Pacific Med. and Surg. Journ., Apr. 1862.

Cases of Belladonna Poisoning treated by Opium.

Amount of Belladonna.	State of Patient.	Age.	Interval since taking Belladonna.	Emesis.	Amount of Opium taken.	Result.	Authority.
10 berries.	Dryness of throat, dimness of sight, followed by delirium.	23	7 hours to the first dose of opium.	3 hours after taking berries.	Tinct. opii ♏xxxv, dose ♏v at first every 4, then every 2 hours (*i. e.* nearly 3 grains of opium).	Cured.	Seaton, Medical Times and Gaz. vol. xix. p. 551–2.
8 berries.	Dryness of throat and tongue, followed by delirium.	25	22 hours to first dose of opium.	4 hours after.	Tinct. opii, ♏xxx, (nearly 2$\frac{1}{2}$ grs.), in dose of ♏x.	Cured.	Loc. cit.
6 berries.	Dryness of throat. etc., intensely delirious.	7	10$\frac{1}{2}$ hr's to first dose of opium.	6$\frac{1}{2}$ hours after.	Tinct. opii, ♏cxliv, in dose at first of ♏viij, every hour, afterwards the dose was doubled as morphia. Whole quantity taken in 15$\frac{1}{2}$ hours, a little more than 9 ♏ per hour.	Cured.	Loc. cit.
2 berries.	Delirious, with the other symptoms of poisoning.	14	11 h'rs.	..	Tinct. opii, ♏cxliv, about 11 grs. of opium in 12 hours.	Cured.	Loc. cit.
12 berries.	Symptoms commenced in an hour, became delirious in 3$\frac{1}{2}$ hrs.	46		From a dose of castor oil.	Tinct. opii, ♏viij, and afterwards ♏xvj, every hour till sleep was obtained.	Cured.	Loc. cit.
5 berries.	Delirium, etc.	8	12 h'rs.	..	Tinct. opii, ♏clxviij, about 13 grs. of opium in 17 hours.	Cured.	Loc. cit.
2 berries.	Delirium, etc.	12	10 h'rs.	None.	Tinct opii, and morphia the equivalent of 24 grains of opium in 38 hours.	Cured.	Loc. cit.
Number of berries unknown.	Delirium, etc.	14	12 h'rs.	8 hours after taking berries.	Tinct. opii, ♏lxxvj, 6 grains of opium in 9 hours, dose ♏viii, at first, increased to ♏xij.	Died 20 hrs. after taking berries; comatose, and pupils widely dilated; in all cases which recovered the pupils contracted before they slept.	Loc. cit.

Amount of Belladonna.	State of patient.	Age.	Interval since taking belladonna.	Emesis.	Amount of opium taken.	Result.	Authority.
4 berries.	Pupils dilated, thirsty, skin hot, pulse 110, these symptoms which appeared in $2\frac{1}{4}$ hours, followed by violent delirium.	9	5 hours till delirium set in, 15 hours to 1st dose of morphia.	..	10 ♏ solution of muriate of morphia (L.) (with f℥j of brandy) 15 hours after eating berries, then fell asleep, during sleep a scarlet rash appeared, woke the next morning delirious and was given the $\frac{1}{3}$d of a grain of morphia in divided doses, but did not sleep till evening: woke well.	Cured.	J. Todd, British Medical Journal, Sept. 21, 1861, p. 305.
Succus. belladonna f℥j.	Pupils dilated, tongue dry, pulse slow and bounding, purple flush of the face, almost comatose.	6	..	None.	Tinct. opii, gtt. 120.	Cured.	Lee, Am. Journal Med. Sci., Jan., 1862, p. 57.
A cup of the infusion of the leaves of belladonna.	Symptoms analogous to those of delirium tremens.	..	..	..	3 centigrammes (nearly half a gr.) of the gummy extract of opium from hour to hour.	Cured.	Cazin, Traité prat. des Plantes Médicin. Paris, 1858, p. 125.
Belladonna plaster on the knee; the cuticle having been previously removed by a blister.	In less than an hour bright erythema of the face, breast, and thighs, with intolerable itching, giddiness, nausea, dilatation of the pupils, constriction of the fauces, and thirst.	Ad't	Less than an hour.	..	Tinct. opii, f℥j, aq. cinnamoni f℥j, afterwards Tr. opii ♏xv. "The first dose antagonized the belladonna in less than 30 minutes after it was taken."	Cured.	Lopez, N. Am. Medical Chir. Review, March, 1860, p. 285.
Belladonna plaster four by two on epigastrium.	Headache, giddiness, nausea without vomiting, dryness of throat, delirium.	..	28 hours to the 1st dose of opium.	..	Laudan. Liq. Syd. gtt. xv, with extr. opii gr. $\frac{1}{4}$ in solution every five minutes; after the first four doses the delirium began to yield, dose repeated now every half hour only. "On the following morning the patient was in a perfectly satisfactory state, and despite the rather large quantity of opium taken, no sign whatever of narcotism was observable, an unanswerable proof of the antagonism of these two medicines."	Cured.	Perroud, Ranking's Abstract, vol. 33, 1861, p. 280.
Suppository containing one gramme (*i. e.* 15.43 grains) of assafetida, extr. belladonna one centigramme (*i. e.* 0.15 gr.) one had been administered every day for six days, when symptoms of poisoning appeared.	Dryness of tongue, face flushed, eyes injected, pupils dilated, mind a little excited.	..	..	..	15 grammes of "sirop diacode" caused subsidence of all the symptoms in 25 minutes. The same quantity was given in the evening with two cups of coffee.	Cured.	Béhier, Ann. de Thérapeutique, p. 22-24, 1860, par A. Bouchardat.

Cases of Poisoning by Atropia treated by Opium.

Amount of atropia injected.	State of patient.	Age.	Amount of opium or its preparations administered.	Result.	Authority.
Sulphate of atropia, gr. 1/4, injected over the sciatic nerve.	Face flushed, breathing hurried, pulse rapid and small, skin hot and perspiring, restless, hands moving as if engaged in his ordinary work, inability to speak from dryness of the mouth, itching of the skin, both corneæ were disorganized (previously), and therefore pupils not visible.	..	Morphiæ muriatis solut. ♏xxv (double ordinary strength of the Edinburgh Pharmacopœia) i. e. about ½ gr. of the muriate of morphia, were injected into the gluteal region of the opposite limb.	Almost immediately became calmer, slept in an hour; next day was quite well.	B. Bell. Edin. Med. Journ., vol. iv., July, 1858, p. 5–6.
Sulphate of atropia, gr. 1-12th.	Dryness of throat, pulse rapid and rather small, slight delirium, subsultus, and jerking of the hands.	..	Morphiæ muriatis solut. ♏xv. (same strength as above) i. e. about ⅓ of a grain.	Relief immediate.	Ibid. p. 6–7.
Sulphate of atropia, gr. 1-30th.	Face intensely red, eyes brilliant, irides dilated, mouth and throat dry, difficulty of swallowing, nausea.	..	"½ grain doses of morphia were given in quick succession, and in another hour the man was out of bed and well, except the mydriasis which remained until the following day."	Cured.	Lee.
Sulphate of atropia, gr. 1-30th.	Toxic effects in half an hour, face and eyes injected, pupils dilated, giddiness and staggering gait, gastric pains but no vomiting.	..	½ grain doses of morphia "promptly allayed the symptoms."	Cured.	Lee.[1]

In addition to the cases detailed in the foregoing table I have met with several others which, however, have not been reported with sufficient accuracy to admit of being tabulated. Thus, M. Béhier gives seven cases of poisoning resulting from subcutaneous injections of the sulphate of atropia; he records one of these at some length, and sums up his remarks as regards treatment thus: "In him, as in six other cases, opium in form either of extract or syrup arrested all the toxic phenomena." (*Ann. de Thérapeutique*, 1860, p. 38.)

M. COURTY, also, treating of the use of the same alkaloid in hypodermic injections, remarks: "Nevertheless, in the small number of cases where the atropic intoxication has given origin to cerebral symptoms which have appeared to require treatment, opium in doses of 25 milligrammes (*i. e.* 0.28 grain) every half hour hastened the return of the functions to their normal state, by neutralizing in a manner the effects of belladonna upon the brain. One to two pills has ordinarily sufficed for a cure." (*Ann. de Thérapeutique*, par A. Bouchardat, 1860, p. 40.)

In addition to the cases referred to in the foregoing table, where opium and belladonna have been given with a belief in their antidotal powers, several interesting observations are recorded where these agents in large quantity have been administered simultaneously through accident. Christison relates the case of a lady poisoned by three successive injections into

[1] I am indebted to my colleague, Dr. C. C. Lee, for the details of these cases. He refers to them in his paper on Opium and the Mydriatics.—*Amer. Journ. Med. Sci.*, Jan. 1862, p. 59.

the vagina, each containing "the active matter of a scruple of opium and half an ounce of belladonna leaves." Three hours afterwards she was insensible and motionless, the face pale, pupils dilated, pulse frequent and small, and the breathing hurried. He remarks: "Here the opium seems to have prevented the delirium usually induced by belladonna in the early stage, while on the other hand the belladonna prevented the usual effect of opium upon the pupils, and actually produced the opposite action."[1] The patient entirely recovered. Cazin gives an instance where six grammes of Sydenham's laudanum with two grammes of tinct. belladonnæ (equivalent to vini opii f℥j, ♏xlv; tr. belladonnæ f℥j, U. S. P.) with forty grammes of the oil of sweet almonds, intended as a liniment, were by mistake swallowed. This large dose caused only somnolence, injection of the face and conjunctiva, and dilatation of the pupils.[2] Dr. Coale reports a case where a child aged nine years swallowed two suppositories containing four grains of extract of belladonna and four grains of opium with very slight effect. The reporter, however, "supposes it possible" in this case that as dinner had been eaten a short time before, this may have retarded absorption.[3] Newman records a case where minute portions of a belladonna plaster accidentally swallowed immediately dispelled the soporific effects of a previous dose of morphia and caused some of the symptoms of belladonna poisoning.[4]

The foregoing cases seem conclusively to show that in opium poisoning, belladonna in doses which in a state of health would certainly poison, may be administered with impunity and be followed by a rapid subsidence of the symptoms produced by the exhibition of the former drug, and *vice versa* that opium rapidly and safely counteracts the poisonous influence of belladonna. The treatment above indicated has, indeed, in some cases failed, and this may prove that they are not mutually specifics; but even in these fatal cases (which are few) we may sometimes see a partial amelioration of the symptoms, and it is well worthy of inquiry how much in these instances the relative quantities of the two drugs administered, the stage of poisoning in which the patient was first seen, the age and constitution may have contributed to the result.

Finally, how do they counteract each other? The mode of action of these drugs on the nervous system is not at present well understood, although several able essays have been written upon it. To those interested in the toxicology of these prominent narcotics I would especially refer as well worthy of perusal the papers of Mr. Hughes *On the Significance of the Contraction and Dilatation of the Pupil produced by Opium and Bella-*

[1] Christison on Poisons. Philada., 1845, p. 742.
[2] Cazin, Plantes Médicinales Indigènes. Paris, 1858, p. 149.
[3] Coale, Amer. Journ. Med. Sci., vol. xxvi. 1853, p. 69.
[4] British Med. Journ., July 13, 1861, p. 30.

donna respectively;[1] Mr. Harley *On the Physiological action of Atropine in Dilating the Pupil;*[2] of Fuller *On the Administration of Belladonna, and on certain Causes which modify its action;*[3] and of Lee *On Opium and the Mydriatics.*[4]

The further investigation of these subjects offers an attractive field for future observers as well as to experimental physiologists. The object of this paper will have been fully attained if it succeeds in drawing more attention to the subject by exhibiting the mass of evidence which has already accumulated to sanction a belief in the mutual antagonism between opium and belladonna.

Art. V.—*On Fracture of the Sternum.* By John Ashhurst, Jr., M.D., late Senior Resident Surgeon to Pennsylvania Hospital.

Patrick G——, a labouring man aged thirty-seven years, was admitted into my ward in the Pennsylvania Hospital on the 26th of December, 1861, with the following curious complication of injuries: His sternum was fairly broken across a little below the junction of the manubrium and gladiolus; his left clavicle was broken very obliquely at the outer third, and the sternal end luxated from its attachments, and riding down over the first rib and broken sternum; in addition to these injuries his left radius was obliquely fractured in its lower third.

The accident had happened in this way: the man was riding in front of one of the small hand-cars used by workmen upon railways, and by a sudden jolt had been thrown forwards between the wheels and beneath the axle of the car, which passing over him crushed his breast against the ground.

The shock at the time of admission was considerable; the dyspnœa very great, and accompanied by constant coughing and spitting of blood. Great anxiety and a firm expectation of death tended to complicate what under the most favourable circumstances would have been a case of very doubtful prognosis.

The displacement of the sternum was inwards, so as to press upon and probably wound the lung, the upper fragment being depressed; the fractured clavicle allowed the shoulder to fall very much forward; while the deformity in the radius was eminently characteristic.

The various injuries were dressed in the following manner: Compresses were placed over both portions of the sternum (so as to relieve the angular inward displacement), over the luxated sternal end of the clavicle and over the seat of fracture in the same bone, and were secured in their places by broad strips of adhesive plaster, and a bandage as firmly applied as could

[1] London Med. Rev., August, 1860.

[2] Edin. Med. Journ., vol. ii. part 1, 1857, pp. 431–435.

[3] Proc. Royal Med. and Chir. Soc., vol. xlii., 1859, pp. 289–308.

[4] Am. Journ. Med. Sci., Jan. 1862, pp. 54–60.

be borne by the patient. Fox's apparatus was applied for the fractured clavicle, and the radius was dressed in the manner usual in this hospital, viz., in a Bond's splint with compresses above and below.

The clavicle apparatus had to be removed in a few hours, as it was found to increase the dyspnœa. An anodyne and expectorant mixture was prescribed, and in the evening carbonate of ammonia in doses of five grains was ordered to be administered every two hours.

The extreme difficulty of breathing (thirty respirations being taken in the minute), the very weak and rapid pulse (120 beats to the minute), and the presence of a cold clammy sweat over the face, made the prognosis very unfavourable, and it appeared extremely improbable that the poor fellow would live through the night.

In the morning, however, he was more easy, the dyspnœa less, and the amount of blood in his expectoration slightly diminished; he was still in a very precarious situation, but continued daily to amend, till, on the 2d of January, 1862, he was able to bear the reapplication of the apparatus to the clavicle. He was at this time supported by a bed-chair; his carbonate of ammonia was diminished, and a strong, but easily digested diet permitted. In a week more he was able to breathe comfortably in a supine position, and the carbonate of ammonia was entirely dispensed with.

As would be expected from the above history, union of the clavicle took place with marked deformity. For the first week, it must be remembered, no apparatus at all could be borne, and orthopnœa prohibited the supine position. When, on the eighth day, the apparatus was reapplied, it had to be left so loose as to be of only comparative utility, and it was not until the third week, by which time union was pretty firm, that treatment capable of maintaining proper apposition of the fragments could be employed. After the fourth week dressings to the radius were omitted, and on January 29th, all apparatus was removed, the arm being merely supported in a sling.

The sternum was united without any perceptible deformity, the dislocation of the sternal end of the clavicle was very much reduced, and the cure might be pronounced under the circumstances very good. He was discharged on the 13th February, having been in the house exactly seven weeks. He subsequently reported himself to me on the 11th of April, 1862, having acquired considerable use of his arm but not able to raise the elbow above the level of the shoulder.

Fractures of the sternum are generally the result of direct violence and of a very powerful force; instances are not wanting, however, in which this bone has been broken by counter-stroke or even by muscular action. As to the cases recorded as happening by counter-stroke or "*contre-coup*," it is somewhat questionable whether they were really fractures, or whether they might not more properly be designated as luxations. That there exists a true joint in the junction of the first and second pieces of the sternum, is declared by Maisonneuve to be the fact in an average of three cases out of five; while the co-ossification of manubrium with gladiolus he regards as absolutely anomalous. (Maisonneuve, *Luxations du Sternum*, in *Archives Générales de Médecine*, Juillet, 1842.)

"The junction of the first sternal bone with the second," says Béclard,

"does not occur until near sixty years, sometimes much later, or even never." (*Journal de Médecine*, 1820, t. i. p. 77.)

I greatly doubt if the proportion of cases in which a true joint (that is with double articular cartilages) occurs, be so great as Maisonneuve asserts; for I find no mention of such a condition in the books of anatomy, nor in fact in any other author; but under any circumstances it would seem more probable that a dislocation or a diastasis should result from a fall on the back, communicating the force to the sternum indirectly, than that the bony fibres themselves should be torn apart. And in very few of the reported cases, have either the symptoms during life, or the post-mortem appearances rendered it certain that a fracture existed rather than a dislocation.

The first case, which is always referred to as an instance of fracture by counter-stroke, is that narrated by David (occasionally quoted under the pseudonym of Bazille), in his prize dissertation before the Royal Academy of Surgery of Paris; this was the case of a man who fell some fifty feet, breaking the spinous processes of two vertebræ, the left thigh, and causing, in the author's words, "the separation of the first bone of the sternum from the second." (David, *Prize Dissertation, etc.*, translated by Justamond, p. 137.) This was, therefore, by the reporter's own statement, a diastasis, not properly a fracture, although spoken of by the author as such, and frequently quoted as such by later authorities.

Sabatier's second case, which he refers to the effect of counter-stroke, was clearly a true fracture; for not only was crepitus present during life, but an autopsy confirmed the diagnosis (*Mémoire sur la fracture du Sternum; Mém. de l'Institut.*, t. ii. an. vii. p. 120 *et seq.*); but the fact of counter-stroke is not very clearly established, unless the circumstance of the man being found lying on his back after twelve hours, be proof that he originally fell in that position. The matter is still further complicated by the patient's having received several violent blows with the fist before being thrown into the trench in which he was found.

Rolland's case, however, quoted by Malgaigne from the *Bulletin de Thérapeutique*, t. vi. p. 288, would appear to leave no room for doubt; in this case, the patient struck her back against a projecting body, and received a fracture through the middle bone of the sternum. (*Treatise on Fractures*, Packard's edition, p. 365.)

Cassan relates a case in which a man jumping from a third story window, fell on his feet, and afterwards on his back, sustaining a transverse fracture of the sternum. (*Cas Rares, Archives de Médecine*, Jan. 1827, p. 82.) The whole case, however, is so briefly reported (occupying in all less than half a page), that it can hardly be decided positively in which category it should more properly be placed.

In the case which occurred at St. George's Hospital, in 1832 (*Med.-Chirurg. Review*, Oct. 1832, p. 536), resulting from a fall on the head, the "fracture" is said to have been "about opposite the cartilage of the third

rib." With this exception, however, the whole description of the case so perfectly answers to Maisonneuve's account of luxation (*Archives de Médecine*, Juillet, 1842, pp. 249–280), that I should be rather inclined to place it in the latter class. Two other cases, quoted by Malgaigne, I have not been able to refer to, and hence am not prepared to say whether they were fractures, or merely dislocations.

Auran gives a case almost identical with that reported by David, and which he very properly designates as a diastasis. It was the case of a mason who fell on his back, fracturing the spinous processes of two vertebræ, breaking also his thigh, and producing a separation of the two upper bones of the sternum. Union took place in twelve days, and the man recovered. (*Journal de Médecine*, par M. A. Roux, tome xxxvi. p. 520.) The same author also gives a case where separation of the first and second bones occurred from a violent effort at lifting made with the shoulder, which the patient had placed under a bar, which he was using as a lever of the second order. An abscess over the seat of injury followed, caries ensued, and the trephine was twice used, with ultimate complete recovery. (*Op. citat.*, p. 531.)

A very interesting case of fracture of the sternum from muscular action is reported by Drs. Lucchetti and Posta, in the *Bulletino delle Scienze Mediche di Bologna*, for April, 1857, in which the accident occurred during labour; here crepitus was pathognomonic of the real existence of fracture, and a cure ensued at the end of thirty-five days. Another case is referred to by the same gentleman, in which death resulted on the fourteenth day, but it is not stated whether an autopsy confirmed the diagnosis. (*Am. Journ. Med. Sci.*, July, 1858, p. 272.) Two more cases of the same kind are given by Chaussier (*Revue Médicale*, 1827, tome iv. p. 260), and Dubos gives a very curious case, in which a juggler, leaning backwards, and trying to lift a great weight with his hands and teeth, felt his breast-bone suddenly give way. (*Maladies du Sternum*, Paris, 1835.) In these three cases the fracture took place above the articulation. Still another case is reported in which the bone was fractured in its upper third from contraction of the diaphragm in vomiting. (*Gazette des Hôpitaux*, March 20, 1830.)

I have been particular in ascertaining, when the means within my reach enabled me to do so, whether fracture really existed in the cases reported as from indirect violence, or whether the injury could not more properly be regarded as diastasis; for upon this we may found an important principle for forming our prognosis.

Luxation or diastasis is comparatively a slight injury, for the posterior ligament remaining intact, as was found in all the cases examined by Maissonneuve (*op. citat.*, p. 269, etc.), the viscera escape laceration, and therefore if there be not some complication which proves fatal, the patient may be expected to recover.

Fracture, on the other hand, is very likely to be accompanied with seri-

ous lesion of lungs or heart; in three instances the heart itself was torn, while in others the pericardium only has been injured. (Hamilton, quoted from *N. Y. Journ. of Med.*, *Treatise on Fractures and Dislocations*, p. 171.) Emphysema and hæmoptysis not unfrequently accompany fracture, and are always alarming symptoms. Dupuytren records a case of fractured sternum, in which the lesion was at the junction of the middle and lower thirds; the upper fragment was much depressed, and after death was found to have pierced the pericardium, and gone through two-thirds of the thickness of the wall of the right ventricle. Several ribs were also broken, and marked emphysema was observed. (*Leçons Orales*, t. i. pp. 120 and 123.)

Now I believe the majority of supposed fractures, resulting from counter-stroke and muscular violence, are nothing more than diastases; and hence, even if the swelling should be so great as to prevent our recognizing the condition of things by local examination, the history of the case may often enable us to form a prognosis, which we could not safely do in any other way.

Malgaigne declares that fractures from direct violence never occur, except in the middle piece of the sternum; hence a blow on the manubrium would cause a diastasis merely, and therefore an accident of which the results would probably be favourable, as in the case recorded by Auran. (*Journal de Médecine*, par M. A. Roux, tome xxxvi. p. 521.)

Even in fractures where no injury is done to the thoracic viscera, abscess of the mediastinal space is apt to take place, and proves a very serious complication; this occurred in both of Chaussier's cases, and in that in which vomiting was the cause of fracture. That equally serious consequences may follow luxation, or that they may even occur without any injury to the bony parietes of the chest is true; but such cases are rare. Lonsdale's case of ruptured trachea, without external injury, is an example of this kind (*Treatise on Fractures*, p. 239), and similar cases are recorded by Gosselin and Alfred Poland (*Holmes' System of Surgery*, vol. ii. p. 386), while as lately as last January, my friend and former colleague, Dr. Charles C. Lee, reported to the Pathological Society of Philadelphia a very interesting case in which rupture of the left lung took place without either fracture or wound of the thoracic walls (*Am. Journ. Med. Sci.*, April, 1862, pp. 419–421). These, however, are among the curiosities of surgical practice, and, as a rule, if the patient has escaped *fracture* in an injury to the sternum, a favourable result may be anticipated.

Fractured sternum, under any circumstances, is a very rare accident. But two cases occurred at the Middlesex Hospital in six years, and at the Hôtel-Dieu only one in eleven years. Hamilton does not refer to a single case as occurring under his own observation, for the case in which he speaks of the ensiform cartilage being "broken in," was evidently a bending of the cartilage, and not a true fracture. (*Op. citat.*, p. 170.) Schenk-

ius quotes from Bauhinus a similar case, in which, however, the deformity was congenital. (*Observ.*, Lib. II. p. 322, Frankfort, 1609.)

Prof. Gross records a case occurring in the practice of Dr. Rohrer, of this city, in which the fracture was in the upper part of the bone, and was produced, according to Prof. Gross, by muscular action, though the description would place it, with equal propriety, under the head of counter-stroke. "A distinct grating noise," it is said, "was heard when the man coughed." This is the only case referred to by Dr. Gross, as having come under his own observation. (*System of Surgery*, vol. ii. p. 167.)

In the record of the Pennsylvania Hospital for the last ten years, I find but two cases previous to my own. The first was that of a labouring man, aged twenty-one, who was admitted on the 28th April, 1856. The fracture, it is stated, was at the junction of the first and second bones, a partial fracture, with a depression of nearly half an inch, and no injury to the soft parts. No apparatus was employed, and the patient left the house by his own request, on the eleventh day, with the deformity unreduced. The injury was produced by a box weighing 800 lbs. sliding upon him, and resting upon the back of his neck. From the fact of this case being reported as a partial fracture, I take it for granted there was no crepitus; from the position, the absence of crepitus, the cause (indirect violence acting by counter-stroke), and the absence of any complication whatever, I have no doubt this was really an example of diastasis.

In the second case, the fracture was near the middle of the sternum, with no injury to the soft parts around the seat of fracture. This patient was also a labouring man, aged twenty-one, who entered the house on August 16th, 1858, having fallen from the height of three stories, striking his loins on a sand heap. The fracture was transverse, and the upper fragment depressed a quarter of an inch; it was treated by means of adhesive strips, completely surrounding the thorax, the patient being kept in a recumbent posture, and he was discharged cured on the thirtieth day. This was a very rare case, the fracture being in the middle of the bone, and yet produced by indirect violence.

I am very kindly permitted by my former colleague, Dr. Lee, to refer to a case which has recently occurred in his ward, and which he reported to the Philadelphia Pathological Society on the 25th of June, 1862. In this case, which was complicated by fracture of the humerus, and of several costal cartilages of the same side, the separation took place immediately below the junction of the first and second pieces. The lower fragment was bevelled from above downwards, and from behind forwards, and the upper fragment correspondingly in an opposite direction. The patient was an old man who had fallen from a considerable height through an open hatchway, and was picked up after several hours, and brought to the hospital in a dying condition. In this case emphysema was very well marked, and the

man expiring shortly after his admission, an autopsy, at which I was present, revealed the fracture as described above.

The following may be regarded as almost positive evidences of the existence of fracture, viz., the presence of crepitus, the situation of the injury being below the junction of the first and second bones, or the fact of the upper overlapping the lower portion. In diastasis, the lower fragment almost always rises in front of the upper, as it is drawn up by the action of the ribs in breathing, while the upper having lost its attachments, remains fixed. In some cases the swelling may be so great as to prevent crepitus being perceived, even if it were present; the depression may be in the upper fragment; and the seat of injury may be so near the junction of the first and second bones, as to cause a doubt as to the true condition. Now, if the injury have resulted from direct violence, we can tell at once whether it be a fracture or dislocation, from the history; if the force has been exerted on the upper bone, it is a dislocation, for fracture from direct violence never occurs in that part; if, on the other hand, the force has been exerted on the middle bone, we may safely assume it to be a fracture, for dislocation has seldom, if ever, resulted from such a cause.

In a case where the injury is from indirect violence, the diagnosis is not so certain; the *prima facie* probability is in favour of dislocation, and if there be no hæmoptysis, emphysema, or other visceral complication, we would be still more inclined to this view; but should an opposite state of things exist, we might properly consider it to be a true fracture.

The prognosis of diastasis if uncomplicated by other injuries is favourable; that of fracture much more doubtful.

The treatment of fractured sternum as regards the bone itself is simple enough; we should endeavour to reduce the deformity, and keep the parts at rest by bandages, adhesive strips, or any other plan that may suggest itself. The constitutional treatment as laid down in the books is actively antiphlogistic; that there are cases in which bleeding may be not only justifiable but absolutely necessary, of course I shall not pretend to deny; but I am very sure that in the case of my patient such a course would have been followed by serious, if not fatal consequences, and I firmly believe that his life was saved by the unsparing use of carbonate of ammonia.

Various plans have been proposed for elevating the depressed bone: reduction can generally be effected by pressing on the ribs, bending the spine over a cushion or bolster, or by similar methods; but in some cases all these plans fail. French surgeons have suggested cutting down and introducing elevators, trephining, the use of a blunt hook, etc.; but even if these methods should succeed in removing the displacement, it would be far from certain that the deformity would not return; and the harm resulting from the conversion of a simple into a compound fracture would be very considerable. I should be governed by the same rules as in a fracture of the skull with depression; if there were already an external opening,

I should remove any loose fragments, and endeavour by appropriate means to restore the parts depressed to their natural position: but in the case of a simple fracture I should hesitate very much before resorting to any such heroic mode of practice.

Nor should we trephine even if an abscess of the mediastinal space should occur; for if the abscess were merely behind the sternum, the symptoms would be too obscure to justify the operation; and if it were more extended, it would point between the ribs at one or the other side, and might be opened with almost no risk to the patient. That the mediastinal space can be cut into without injury to the pleura is shown by many cases, among others by one which came under my own observation. (*Am. Journ. Med. Sci.* for Jan., 1862, p. 64.)

Professor Gibson, formerly of the University of Pennsylvania, has several times trephined for abscess beneath the sternum, but concludes his remarks on the subject in the following words: "Experience, however, has taught me latterly that the operation of the trephine just referred to is seldom productive of lasting benefit. In patients upon whom I have operated I have found the caries to return, and eventually death has taken place—apparently from phthisis pulmonalis." (*Inst. and Pract. of Surgery*, vol. i. p. 253.)

Malgaigne records one case each of longitudinal and of splintered fracture; the latter from his own observation, the former quoted from Barrau. Ploucquet quotes two cases of longitudinal fracture, one from Kraemer and one from Meyer, in which it is stated that the injury resulted from pressure, (*ex pressione corporis*), and that union did not take place. (Ploucquet, *Literatura Med. Digesta*, vol. iv. p. 81.)

I have said nothing about fracture of the ensiform cartilage, because, though spoken of by Gibson and other systematic writers, I can find no instance of it on record. Hamilton's case already referred to does not seem to have been properly a fracture.

PHILADELPHIA, July 26, 1862.

ART. VI.—*Some Experiments on Poisoning with the Vegetable Alkaloids.* By J. H. SALISBURY, M. D.

OF the detailed action of the vegetable alkaloids, either in medicinal or poisonous doses, upon the animal system, we know too little. There is enough, however, known to warrant the statement, that there is no class of bodies destined to occupy a more important place in our materia medica, and none through which (when properly administered) we can more readily influence diseased conditions—functional or organic.

One interesting action of aconite, as developed by these experiments, is the peculiar persistent tonic contraction it produces in the muscular fibres, thereby tending to empty all open cavities of the body. Another is its influence in producing paralysis of the nerves of sensation and motion.

Veratria is remarkable for preserving the animal heat, the arterial condition and great fluidity of the blood, and for producing symptoms somewhat resembling those of hydrophobia.

Picrotoxin and hyoscyamus produce a peculiar kind of spasmodic muscular motion, &c.

Reserving further comments for a future occasion, we offer the following examinations as a part of a series of experiments in which we have for several years been engaged. We hope some features in them may interest others to enter carefully upon similar inquiries.

I. *Poisoned a Cat with Tincture of Aconite.*—On the 27th of March, 7 A. M., administered to a small cat (one which was somewhat debilitated from a previous small dose of aconite) six drops of what is called by homœopathists the mother tincture of aconite. In administering it I opened the cat's mouth, held her head back, and poured the six drops directly into the throat. The whole was swallowed.

7h. 10m. Commenced swallowing as if there was something in the throat.

7h. 15m. Commenced vomiting. Vomiting continued at intervals for twenty-five minutes. Internal muscular spasms and contractions severe; breathing laboured; eyes fixed and glassy; pupils dilated.

7h. 40m. Vomiting ceased. During vomiting there was considerable vertigo and dimness of sight, which increased till vomiting ceased, when there was so much exhaustion that the cat was unable to stand. She fell down upon her side; her head drawn back; limbs all extended, and toes drawn in. She lay in this position, having an occasional spasm, till death, which took place at 8 o'clock and 30 minutes, precisely one and a half hour after the poison was administered. When dead her head was drawn back; limbs all extended; mouth closed firmly; eyes open, glassy; pupils somewhat dilated; toes drawn up towards soles of the feet; some frothing at the mouth, and the whole muscular system in a state of tonic contraction.

Post-mortem seven and a half hours after death—assisted by Dr. Swinburne.—There was a general tonic muscular contraction, producing unusual rigidity. Jugulars full; mesenteric veins full; intestines shortened in length and decreased in diameter.

Stomach contracted to about one-third its normal size; mucous membrane drawn into folds or rugæ. Folds mostly longitudinal towards the upper curvature; more zig-zag towards the lower curvature. Contents a small quantity of mucus, tinged with blood and bile. Mucous coat very much congested; of a brownish-red colour; some spots deeper than others.

Duodenum contracted in length and diameter; considerable congestion of mucous membrane; but less than in the stomach. Contents, small quantity of mucus adhering to the mucous membrane, slightly tinged with blood.

Jejunum contracted both in length and diameter. Mucous membrane considerably congested.

Ileum contracted both in length and diameter. Mucous membrane

slightly congested, and towards the upper portion covered with mucus, slightly tinged with blood. The lower portion contained a small quantity of fecal matter, mixed with something resembling bile.

The *cæcum* and upper portion of the colon contained considerable fecal matter, which was thin and watery. The lower portion of the *colon* and the *rectum* were filled with fecal matter much more hard and dry. The walls of intestines thick and rigid. The whole length contracted; but the small intestines more than the large. The stomach, duodenum, and jejunum were drawn into folds, or corrugated; the two latter but slightly.

Bladder very much contracted; walls thick. Had the appearance of a hard, round ball; entirely empty.

No congestion of *brain;* simply fulness of the veins.

Small portion of *lungs* were slightly congested, especially those portions which came in contact with the diaphragm.

Liver slightly congested in those portions which came in contact with diaphragm and stomach. *Gall-bladder* nearly empty.

Veins generally full.

When the cat was *vomiting*, most of the time she was standing, leaning against the side of the room, seemingly unconscious; eyes fixed and glassy, and pupils somewhat dilated.

Peculiar symptoms previous to death.—Spasms in throat and swallowing; general muscular rigidity; frothing at mouth; severe internal spasms; and vomiting of mucus, frothy matter, and food, almost without intermission. Extension of all the limbs; head drawn back; eyes fixed and glassy; toes drawn in towards soles of feet; general paralysis of nerves of sensation and motion; vertigo, and a death-like stupor.

Peculiar post-mortem appearances.—General muscular rigidity; jaws firmly closed; stomach contracted to about one-third its normal size; intestines shortened in length and diameter diminished. Mucous membrane of stomach highly corrugated or drawn into folds. Effusion of blood into stomach and small intestines. Mucous membrane of stomach and small intestines highly congested. A rigid tonic muscular contraction of bladder. Gall-bladder partially emptied, and general fluidity of blood.

II. *Effects of Tincture of Aconite on the Human System in Poisonous Doses.*—In the fall of 1852 I attended Miss J., aged 19 years, during an attack of meningitis. She possessed a vigorous constitution, and had always, up to the period of this attack, enjoyed excellent health. After recovery she was affected with severe neuralgic pains in the head and limbs, with some slight paralysis of the sphincters and bladder. For these I was giving tincture of aconite with decided benefit, in connection with other medicine. The preparation of aconite used was a solution of five drops of the tincture (prepared according to the formula in the *U. S. Dispensatory*) to one hundred drops of water. Ten drops of this solution was the prescribed dose. This was to be taken every hour through the day. I had cautioned her particularly against taking a larger dose. One afternoon, during a call of some lady friends, she thoughtlessly drank from the bottle about four drachms of the solution, which would be equal to twelve drops of the tincture. This dose was taken about $5\frac{1}{2}$ o'clock P. M. At 6 o'clock, half an hour after, I was called to see her. Arrived at six o'clock and ten minutes. Found her seated in an arm chair, held there by her mother. She was unable to speak. All the muscles of the body were in a state of rigid tonic contraction. She was

scarcely able to move a limb, and when motion was effected it seemed difficult to control it. The whole muscular system affected with slight spasmodic twitches, which apparently kept time with the pulse. Pulse small, spasmodic, and irregular; cold, clammy sweat over whole surface of body; hands clenched; jaws firmly closed, unable to speak; eyelids nearly closed; eyes fixed and glassy. A death-like weight and griping constriction in stomach and bowels. Felt as if she was dying, and as if everything inside would be forced out—as she described it after recovery. Nerves of sensation and motion quite paralyzed. Breathing laboured; a feeling of suffocation. Knew what was passing around her; but could not speak. Hacking and swallowing at times. Remained in this condition between two and three hours. Under the application of stimulants and friction she gradually recovered, so that on the following morning she felt quite well, with the exception of a "death-like feeling of tightness," as she described it, at the "pit of the stomach." This passed away in the course of two or three days. Although great danger attended this over-dose of aconite, yet it had a salutary effect upon the disease.

Enumeration of Peculiar Symptoms.—Tonic muscular contraction over whole body; jaws fixed, unable to speak; hands clenched; muscular twitchings, which keep time with the pulse; breathing laboured; a feeling of suffocation, and a death-like weight and griping constriction at pit of stomach. Conscious of what was passing around her; but unable to speak or tell her wants. Cold, clammy sweat over whole body. No vomiting, yet felt as if everything inside would be forced out. Almost complete paralysis of nerves of sensation and motion. Spasms in throat, which gave rise to hacking and swallowing at times.

III. *Poisoned a Large Male Cat with Tincture of Aconite.*—June 8, 1853, 10 o'clock 5 minutes A. M. Administered to a large healthy male cat, full grown, twelve drops of tincture of aconite. Gave it by setting him upon his hips, securing legs, holding head back, and pouring the tincture directly into the throat.

10h. 7m. Commenced swallowing as if something was in the throat.

10h. 8m. Vomited about half drachm of frothy matter and food; then commenced frothing at the mouth and swallowing, which continued till 10 o'clock and 19 minutes.

10h. 19m. Vomited about half drachm of white frothy mucus; after which continued to froth at the mouth and swallowed till 10 o'clock 21 minutes.

10h. 21m. Vomited about half drachm of white frothy mucus, mixed with traces of food. Remained in one position from 10 o'clock 7 minutes to 10 o'clock 22 minutes.

10h. 22m. Vomited slightly, and turned partly around.

10h. 24m. Vomited. Considerable vertigo; staggered in walking. Pupils dilated; scarcely notices anything about him. Nerves of sensation and motion quite paralyzed.

10h. 25m. Vomited. Spasms in vomiting more severe than at first. Made a moaning noise.

10h. 27m. Vomited about quarter drachm of mucus. Losing control of limbs. Strength rapidily declining. Cannot stand without leaning against the wall. Breathing begins to be laboured and difficult. Swallowing less frequent. Frothing less.

10h. 37m. Nearly ceased frothing and swallowing; breathing very

laboured, short, and irregular. Pulse small, corded and irregular. Eyes fixed and glassy.

10h. 50m. A disposition to raise himself up and stand on hind legs. Vomited slightly; occasional internal muscular spasms. Lying on the right side, quite exhausted.

11h. Severe internal muscular spasms as in vomiting, but nothing vomited.

11h. 5m. Same as last. 11h. 10m. Same. 11h. 15m. Same.

11h. 27m. Same as last. Breathing very difficult and irregular.

11h. 35m. Lying on side, apparently in great pain, moaning at every breath. Breathing very short and laboured. Pulse scarcely perceptible.

11h. 45m. Several internal spasms.

11h. 50m. Lying on right side, breathing short and laboured. Eyes very much sunken. Unable to move. Pulse scarcely perceptible. Eyes fixed, rolled back, and glassy.

12h. 8m. P. M. Severe internal spasms. Frothing commenced again at the mouth.

12h. 25m. Moaning, and lying on side. Begins to move his head. Breathing slightly easier. Eyes still fixed and glassy. Pupils dilated and quite insensible to light.

1h. 15m. Gave him five drops more. So much irritation about throat and fauces that spasms were produced preventing swallowing when tincture was poured into throat.

1h. 35m. Gave six drops more.

2h Gave four drops more.

2h. 13m. Vomited mucus slightly.

2h. 25m. Vomiting; moaning. Fell upon side exhausted. Breathing laboured, short, and irregular.

2h. 30m. Severe internal muscular spasms as if in vomiting.

7h. 30m. About 3 P. M. sank into a stupid state, in which he has continued till a short time before death. At intervals moaned pitifully: occasional feeble internal spasms.

Died at 43 minutes past 7 P. M., nine hours and thirty-eight minutes after first dose was administered.

Post-mortem 47 *minutes after death.*

Veins.—Jugulars full; mesenteric veins full. Venæ cavæ less full than the jugulars and other small veins.

Stomach about one-third its natural size. Very much corrugated from muscular contraction. Walls thick and rigid. Mucous membrane highly congested, has a dark reddish pink colour. Some portions darker than others. Stomach empty with the exception of a small quantity of frothy mucus, tinged with blood adhering to inner coat.

Duodenum much contracted in length and diameter. Slightly corrugated. Empty with the exception of a small quantity of frothy mucus, tinged with blood, adhering to mucous membrane. Mucous surface highly congested and of a dark reddish pink colour.

Jejunum contracted in length and diameter; considerable congestion but less than in the duodenum. Empty with the exception of a small quantity of mucus tinged with blood.

Ileum contracted like jejunum; congestion slightly less than in the jejunum. Contents, small quantity of mucus tinged with blood—less than in jejunum.

Cæcum, colon and *rectum* somewhat contracted; considerable conges-

tion in patches, in cæcum and upper part of colon. Rectum natural; colon contained a small quantity of fecal matter, thin and watery. Rectum full of fecal matter, in the upper portion soft and in the lower portion drier and more firm.

Gall-bladder partially empty; contents black, tarry, thick and viscid.

Liver slightly congested in those portions in contact with stomach and diaphragm. Portal veins full.

Lungs natural, with the exception of those portions in immediate contact with the diaphragm.

Heart contained a small quantity of fluid blood, and a little fragment of clot in the right ventricle. In other parts of body, blood dark and fluid. Left ventricle empty.

No congestion of *brain*, simply venous fulness.

Bladder contained about half a drachm of urine; walls firmly contracted upon their contents; thick and rigid.

Intestines.—Whole *length of intestinal canal* four feet four inches. Length of intestines of a cat about the same size poisoned with belladonna, five feet five inches. Length of intestines of one poisoned with stramonium (about same sized cat) five feet ten inches.

Peculiar symptoms before death.—Swallowing and spasms in throat; frothing at mouth; paralysis of nerves of sensation and motion; almost constant spasms in the region of the stomach and diaphragm, accompanied by vomiting. Eyes fixed and glassy; pupils dilated; vertigo; breathing laboured; pulse small and irregular, apparently unconscious of surrounding objects; takes no notice when called; muscular contraction of a tonic character.

Enumeration of peculiar post-mortem appearances.—General muscular rigidity, jaws closed, stomach and intestines very much contracted; mucous membrane of stomach very much corrugated and congested; blood effused into stomach and small intestines, blood fluid; rigid muscular contraction of bladder. Gall-bladder partly empty.

IV. *Poisoned a Female Dog with Tincture of Aconite. Administered per Anum.*

June 18, 1853, 11 o'clock 5 minutes A. M. Administered three drachms of tincture of aconite (U. S. P.) per anum to a dog above the medium size, which had eaten nothing since 6 P. M. yesterday.

11h. 7m. Severe tenesmus of rectum and bladder; passed urine and slight quantity of fecal matter.

11h. 10m. Constant tenesmus of rectum and bladder, passed small quantity of fecal matter. Eyes dull and heavy.

11h. 15m. Constant tenesmus. Passed about half drachm of fecal matter. Eyes dull and heavy. 11h. 25m. Same.

11h. 29m. Commenced panting with mouth open, constantly in position to discharge bowels. Constant straining.

11h. 31m. Uneasy, moving around.

11h. 32m. Commenced drooling, constant tenesmus.

11h. 38m. Vomited slightly about half drachm of frothy mucus. Frothing at mouth. Slight muscular spasms in hind part of body, drawing legs up towards abdomen. Panting and drooling.

11h. 42m. Stiffness and partial paralysis of nerves of sensation and motion in posterior parts of body; severe and constant tenesmus.

11h. 45m. Passed small quantity of thin watery fecal matter, vertigo

increasing rapidly. Hardly able to walk without falling. Constant panting and droolings. Eyes glassy, pupils dilated. Vision indistinct.

11h. 48m. Fell upon side, where she lay three minutes, got up, whirled around a few times. Constant straining with slight passage from bowels and bladder.

11h. 50m. Vomited a small quantity of frothy mucus. Tenesmus severe and constant. Passed about two drachms of soft fecal matter, mixed with mucus. Frothing at mouth continued. Vertigo increases, uneasy. Staggering about, lying down, then getting up and attempting to walk. Stupid. Partial paralysis of nerves of sensation and motion.

12h. Tenesmus constant and severe. Passed about half ounce of thin, watery, slimy, fecal matter. Limbs quite stiff and rigid.

12h. 5m. P. M. Discharge of thin watery fecal matter, mostly water, about one ounce.

12h. 20m. Slightly easier. Some short intermissions in tenesmus. Less vertigo.

12h. 22m. Administered two drachms more of tincture of aconite per anum.

12h. 24m. Slight passage of urine, also passed nearly all the tincture administered at 12 o'clock 22 minutes.

12h. 50m. Apparently in considerable pain. Lying on side. Slight passage from bowels of watery fecal matter. Tenesmus becoming intermittent. It has been constant up to this time.

1h. Gave an injection of four drachms more of tincture. Rectum appears to be perfectly paralyzed; so much so that the injection of four drachms has no apparent effect upon it. Walked off and laid down on side; where she remained quiet till 1 o'clock and 30 minutes.

1h. 30m. Breathing becoming difficult. Eyes glassy and pupils dilated. Occasionally raising up one foot.

1h. 43m. Vomiting with severe spasms and a loud choking noise, with frothing at the mouth. Extreme vertigo.

1h. 50m. Lying on side. Breathing spasmodic, pupils much dilated and insensible to light.

1h. 56m. Scratching her head with her fore foot. Strangling and choking.

2h. Lying on side. Spasms in posterior part of body. Spasmodic twitching of muscles generally. Breathing difficult. Lolling; unable to stand. Pulsations irregular.

2h. 46m. Raised herself on her feet, then settled down upon her abdomen and held her head up.

2h. 52m. Gave two drachms more by injection per anum.

3h. 31m. Lying on side. Heart beats slow, full, and irregular.

3h. 25m. Howled. Severe spasms of muscles of respiration, which lasted about one minute. This was followed by a large passage of watery fecal matter.

3h. 27m. Respiration ceased in a severe general convulsion. Heart ceased beating about one minute after.

There is less general muscular rigidity in this case than either of the others. This may possibly be owing to the fact, that infusion of tobacco was given to her about twelve hours before I administered to her the first injection of aconite. The first dose (three drachms), if it had not been partially discharged by the constant straining, would no doubt have pro-

duced death in a short time after it was administered. The second dose of two drachms, administered at twelve o'clock and twenty-two minutes, was mostly discharged two minutes after. When the four drachms were given at one o'clock P. M., the lower bowels had become torpid or paralyzed, hence the poison was not discharged, nor did it produce any decided effect upon the system until its influence had reached the upper portion of the intestines and stomach. Very severe vomiting and choking commenced forty-three minutes after the four drachms were administered. At two o'clock fifty-two minutes P. M., gave two drachms more. In thirty-three minutes afterwards, this was passed with fecal matter, which was probably brought down from the upper portion of the bowels by the severe muscular spasms produced by the previous dose.

Peculiar symptoms.—Constant tenesmus of bladder and rectum from three minutes after the injection was made till one hour and forty-five minutes after, when it became intermittent.

Vomiting commenced thirty-three minutes after the first dose was given. Frothing at the mouth commenced at the same time. Paralysis commenced in the posterior parts of the body and advanced towards the head. The other symptoms similar to symptoms in the case when aconite was administered per orem.

Post-mortem 4 hours and 33 minutes after death.—Whole intestinal canal shortened and diminished in diameter. Rectum so much contracted that it would have been difficult to have introduced a goose-quill; walls thick and rigid; entirely empty, save a thin coating of mucus tinged with blood. High state of congestion. The contraction and congestion diminished in the direction of the stomach. The whole intestinal canal, however, was highly congested and entirely empty, except a thin coating and a small quantity of fecal matter, thin and watery, in the lower portion of jejunum.

The stomach was very much contracted, walls thickened, and mucous membrane drawn into folds and highly congested; entirely empty. Saw a small quantity of mucus adhering to mucous membrane. Bladder entirely empty and drawn into a hard round ball. Slight congestion in the portion of lungs next to diaphragm.

V. *Poisoned a Female Dog with Tincture of Aconite.* June 11, 1853, 3 o'clock 38 minutes P. M. Administered to a dog aged about 4 years, and weighing $15\frac{1}{2}$ pounds, sixty drops of tincture of aconite; strength, two parts of root to four parts of alcohol. Do not know how long before taking the poison the dog had eaten food.

3h. 4m. Commenced swallowing, and opening and shutting the mouth and licking lips with tongue.

3h. 42m. Vomited about three ounces of frothy white matter mixed with undigested food. Passed water.

3h. 43m. Vomited about one ounce of greenish frothy matter mixed with food. Eyes glassy and somewhat fixed.

3h. 44m. Vomited about one-half ounce of white frothy mucus.

5h. 45m. Vomited about one drachm of greenish-white frothy mucus.

3h. 46m. Vomited about one drachm of greenish-white frothy mucus.

3h. 47m. Vomited about one drachm of greenish-white frothy mucus. Frothing at mouth. Passed water. Breathing laboured.

3h. 50m. Severe internal spasms or efforts to vomit. Breathing difficult. Lying on abdomen groaning, head up. Made an effort to get up, and finally succeeded, but could not stand without reeling.

3h. 55m. Fell on side. Severe internal spasms. Great difficulty in breathing. Moaning. Pupils dilated. Vision indistinct. Losing control of limbs.

4h. Endeavoured to get up, but fell back on side. Heart beats irregularly. Respiration difficult and irregular. Severe internal spasms of muscles of stomach and diaphragm. Wagging tail. Limbs stiff, rigid, and extended.

4h. 3m. Raised on her feet; tried to walk, but fell over.

4h. 5m. Raised again on feet, but fell on side, attempting to walk. Pupils dilated. Eyes glassy and fixed. Takes no notice when called, or of surrounding objects. Severe internal spasms. Great muscular rigidity.

4h. 10m. Slight frothing at the mouth. Raised on feet and attempted to walk, but fell over. Quite lost use of limbs. Muscles rigid.

4h. 13m. Lying on side. Breathing slightly easier.

4h. 15m. Breathing slow and irregular; from six to eight respirations per minute. Wagging tail. Muscles rigid, but less so than at four o'clock and ten minutes.

4h. 20m. Had eleven respirations during the last two minutes, then ceased to breathe for three minutes.

4h. 23m. Commenced breathing again. Had eight respirations and then an intermission. This was followed by great muscular rigidity.

4h. 25m. Commenced breathing again. Breathing heavy and difficult. Attempted to raise herself on fore feet. Severe internal spasms, and effort to vomit.

4h. 28m. Succeeded in raising herself on her feet, but soon fell on her side. Severe internal spasms, and breathing irregular and difficult.

4h. 35m. Severe internal spasms. Lying on side.

4h. 38m. and 4h. 40m. Severe internal spasms and efforts to vomit.

4h. 55m. Administered fifteen drops more of tincture of aconite.

4h. 57m. Mouth open. Standing on feet and making an effort to walk. Severe internal spasms. Fell upon side. Pupils dilated. Ceased breathing for two minutes and then drew one breath.

5h. Ceased breathing. Heart ceased beating. Eyes open and glassy. Death occurred one hour and twenty-two minutes after the first dose was administered.

Peculiar symptoms before death.—Swallowing, and opening and shutting mouth. Licking lips. Tonic muscular rigidity. Limbs extended. Severe internal spasms almost constant, attended with severe efforts to vomit. Passage of urine. Eyes fixed and glassy; pupils dilated. Frothing at mouth. Severe spasms of muscles of respiration. General paralysis of nerves of sensation and motion. Respiration irregular and laboured.

Post-mortem June 12th, 16 hours and 20 minutes after death.—Considerable tonic muscular rigidity. General venous fulness; jugulars distended with blood; mesenteric veins distended with blood. Blood dark and unusually fluid.

Bladder empty; contracted to a hard, round ball.

Small intestines six feet six inches long. *Large intestines* twelve inches long.

Stomach very much contracted, about one-third its usual size; mucous membrane very much corrugated, highly congested, and covered with a small quantity of frothy mucus tinged with blood, which was the only contents of the stomach.

The *duodenum* was much contracted, both in length and diameter; mucous membrane highly congested, with some spots more highly reddened than others, and covered with a coating of mucus tinged with blood and bile.

The *jejunum* very much contracted in length and diameter, and highly congested; the lower portion is less congested than the upper portion, but equally contracted; contents, mucus adhering to mucous membrane, and tinged with blood.

The *ileum* was contracted equally as much as the jejunum, but the mucous membrane is less congested; empty, with the exception of a small quantity of mucus tinged with blood and bile.

The *cæcum* was filled with fecal matter, thin and watery; mucous membrane slightly congested.

The *colon* contained a small quantity of thin, watery fecal matter of a dark colour; very much contracted; otherwise normal in appearance.

Rectum considerably contracted in length and diameter, and contained a small quantity of fecal matter, thin and watery, but no perceptible congestion. All the small intestines very much contracted in length and diameter.

A general fulness of vessels of *kidneys*.

Slight congestion of *lungs* in those portions coming in contact with the diaphragm.

In the *liver* there was slight congestion, especially in those portions coming in contact with the stomach and diaphragm.

The *gall-bladder* was partly filled with a yellowish bile and a black tarry matter.

The *heart* was quite empty, except the right auricle; the venæ cavæ were only partially full of dark, mostly fluid blood.

The *œsophagus* was white and pearly, except near the cardiac orifice of the stomach, where there was considerable congestion. The mouth and fauces were quite natural, except a coating of frothy mucus.

Brain.—There was considerable congestion of the membranes of the brain, and slight congested spots in its substance; slight effusion in ventricles; sinuses and large veins full.

Post-mortem appearances that are peculiar.—General tonic muscular rigidity. Jaws stiff and closed. Limbs extended. Head drawn back. Stomach and intestines highly congested and much contracted, the former being drawn into folds on the mucous surface. Effusion of blood into stomach and small intestines; blood mostly fluid and dark coloured. Bladder in a state of rigid contraction and empty. Gall-bladder partly empty, and contents peculiar.

VI. *Poisoned a Female Dog with Tincture of Aconite.* June 12, 1853. —Height of dog at shoulders $14\frac{1}{2}$ inches; length from top of skull to base of tail 1 foot 10 inches; weight 16 pounds; age about 1 year. Healthy and in good condition.

10 o'clock 15 minutes A. M. Administered to-day sixty drops of tincture of aconite. Strength, two parts root to four parts of alcohol. The dog has not taken food since 2 P. M. yesterday.

10h. 17m. Vomited about a half drachm of frothy matter, after which commenced swallowing and opening and shutting mouth, and licking lips. Respiration becoming difficult.

10h. 18m. Vomited about one drachm of white frothy matter, with a little food. Great difficulty in breathing, so much so that she makes a barking, wheezing noise every breath. Breathing very slow. Lying upon side, pawing mouth with fore paws. Severe internal spasms of stomach and muscles of respiration.

10h. 23m. Losing use of limbs, so much that she can hardly move them. Eyes fixed and glassy; pupils dilated. Has been as yet no frothing at the mouth. General muscular tremor.

10h. 25m. Pawing her head, and groaning. Respiration about eight per minute, and difficult. Pulse feeble, and about 120 per minute. Severe internal spasms. Complete paralysis of nerves of sensation in limbs. Takes no notice when pins are run into them.

10h. 30m. Passage of hard fecal matter from bowels. About two pulsations per minute. Gasping for breath; from two to three inhalations per minute.

10h. 35m. Breathing ceased. Heart ceased beating. Eyes open and glassy; pupils dilated. Death twenty minutes after poison was administered.

Post-mortem $24\frac{1}{2}$ hours after death.—Whole body quite rigid. Jaws set firmly. Limbs extended and stiff. Jugulars distended. Mesenteric veins full. Length of small intestine sixty-one inches; length of large intestine fourteen inches.

Stomach very much contracted, about one-third its usual size; walls thick and firm; mucous membrane very much corrugated; corrugations longitudinal mostly towards the upper curvature, towards the lower somewhat zigzag; highly congested, some spots redder than others, and covered with mucus tinged with blood; stomach otherwise empty.

Duodenum contracted in length and diameter; mucous membrane slightly corrugated and highly congested, and covered with a frothy mucus reddened with blood towards the upper portion, and coloured with bile in the lower part; otherwise empty.

Jejunum contracted considerably in length and diameter; upper portion highly congested, lower portion but slightly congested; mucous membrane covered with mucus tinged with blood; no other contents.

The *ileum* was considerably contracted in length and diameter. The mucous membrane was slightly congested in spots in the upper portion. Contents, mucus in the upper portion and a small quantity of fecal matter and bile in the lower and middle portions.

The *cæcum* was filled with fecal matter.

Colon but slightly contracted; had a healthy appearance; contents, small quantity of thin fecal matter.

The *rectum* was quite natural in appearance; partly filled with hardened feces.

The *bladder* was very much contracted; appeared like a round, hard ball; entirely empty.

The *kidneys* natural.

The *œsophagus, fauces,* and *mouth* coated with mucus; otherwise healthy in appearance.

The *liver* somewhat congested in those portions coming in contact with diaphragm and stomach.

The *gall-bladder* was about two-thirds full of a clear gelatinous bile, mixed with a small quantity of dark tarry matter.

Considerable congestion in those parts of the *lungs* in contact with diaphragm.

Right side of *heart* filled with clot; the left side empty, with the exception of a small fragment of clot. The venæ cavæ partly filled with fluid and clotted blood. Smaller veins filled with dark fluid blood.

Membranes of the *brain* somewhat congested. Slight effusion in ventricles; otherwise healthy.

VII. *Poisoned a Large Female Rat with Tincture of Aconite.*—Caught a large female wharf rat in a wire cage about 8½ o'clock P. M. June 13th. The rat was nine inches in length from tip of nose to base of tail. In attemping to get out of the cage she rubbed the skin off her nose, so that there was an abraded surface, that bled slightly, about the size of a half dime. Upon this abraded surface I commenced dropping the tincture of aconite at 9 o'clock and 10 minutes P. M. of June 13th. In the course of fifteen minutes I dropped on twenty-five drops, one-fourth of which ran off.

9h. 25m. Began to grow stupid. Breathing somewhat laboured, ceased jumping about the cage, slight spasms, pupils slightly dilated.

9h. 45m. Moans and sighs in breathing, breathing irregular. Quite stupid. Eyelids partially closed.

10h. Stupid, breathing irregular and difficult. Slight spasms of muscles of respiration. Makes a slight sighing noise.

10h. 12m. Sudden and severe spasms causing her to throw herself upward against the top of the cage.

10h. 14m. Fell exhausted. Lying on side, breathing slow, short and laboured, losing use of limbs, vertigo.

10h. 18m. Quiet, lying on abdomen, difficult to arouse her. Lay in this condition till 10 o'clock and 45m. Commenced panting heavily, very stupid, eyelids almost closed.

11h. 10m. Violent internal spasms followed by slow irregular breathing; occasional feeble and rapid spasmodic twitching of muscles.

11h. 15m. Spasms, breathing more slow and difficult.

11h. 25m. Violent spasms, gasping followed by short and hurried respiration.

12h. Slight spasms, breathing more regular and less difficult, gaining strength, just able to stand, left her for the night.

June 14th. 7h. A. M. Very dull and stupid, eyelids nearly closed, lying upon chest and abdomen, with head between fore legs, quiet.

8h. 30m. The same as at 7 o'clock.

8h. 35m. Dropped six drops more of tincture of aconite on abraded surface.

8h. 43m. Breathing becoming more difficult, attempted to walk, could not without reeling and falling; finally fell upon side when she remained quiet in a nearly comatose state, till 11 o'clock and 45 minutes, when she had a severe, sudden spasm, which threw her violently against the top of cage and at 11 o'clock and 47 minutes respiration ceased. There was no vomiting or purging in this case.

Post-mortem 51 *minutes after death.*—Considerable rigidity of muscular system. Limbs stiff. Jugulars distended. Mesenteric veins full. Length of small intestines 51 inches. Length of large intestines 9 inches.

Stomach contained about one drachm of partly digested food, apparently

parts of a mouse. No congestion or corrugation. Quite natural in appearance.

Duodenum empty except a small quantity of bile. Healthy.

Jejunum contained a small quantity of fecal matter throughout its whole length.

Cæcum, colon and *rectum* all healthy in appearance and partly filled with fecal matter.

Portal veins full.

Gall-bladder nearly empty, contents black and tarry.

Lungs considerably congested, especially the lower lobes coming in contact with diaphragm. Surface vessels of the *heart* distended; both the right and left auricle and ventricles filled with a tough hard clot. Venæ cavæ also contained some clot. Blood in smaller vessels dark and fluid.

Brain normal in appearance, except a venous fulness, in membranes and base of brain. Slight effusion in ventricles.

VIII. *Poisoned a Large Male Cat with Tincture Nux Vomica.*—At 11 o'clock and 30 minutes A. M., June 8, administered to a large male cat twenty-six drops of tincture nux vomica, usual strength. Administered it by securing legs, holding head back, opening mouth and pouring the tincture directly into the throat. Slight internal spasms at 11 o'clock and 33 minutes. Vomited about one quarter drachm of partially digested food.

11h. 35m. Affected with swallowing, vomited slightly.

11h. 37m. Vomited a small quantity of food and frothy matter.

11h. 44m. Vomited a small quantity of food and frothy matter and two minutes after vomited again slightly. Severe spasms of diaphragm and stomach at intervals.

11h. 55m. Tetanic symptoms begin to appear.

12h. 5 P. M. Commenced breathing very short and rapid, about two hundred respirations per minute, panting, quite lively, comes when called, purs when back is stroked.

12h. 25m. Slight tetanic symptoms, respiration easy, about one hundred and fifty per minute. Apparently quite recovered. Administered 25 drops more of tincture.

12h. 57m. Severe tetanic symptoms. Lay in violent convulsions for 1½ minutes; this passed off leaving him weak and stupid. Breathing rapid. Eyes closed, difficult to arouse him.

1h. 35m. Administered 15 drops more of the tincture.

1h. 37m. Tetanic symptoms begin to show themselves.

1h. 38m. Convulsions very severe, lasted two minutes.

1h. 40m. Panting, breathing laboured, lying on side.

1h. 55m. Convulsions severe, continued with short intervals till 2 o'clock and 4 minutes, when breathing ceased.

Post-mortem 1 hour and 56 minutes after death.

Bladder moderately full of urine, walls thin and soft; no muscular rigidity.

Œsophagus considerably congested, lower portion presented a shrivelled appearance of mucous membrane.

Stomach quite natural in appearance; no muscular rigidity, mucous membrane slightly corrugated; no congestion; contents bile and frothy mucus.

Cat had not eaten since yesterday at 4 P. M. No contraction in duode-

num. Slight congestion of mucous membrane; contained a small quantity of bile and mucus.

Jejunum empty; slight congestion.

Ileum contained a small quantity of fecal matter along its whole length. Healthy in appearance.

Cæcum, colon and *rectum* filled with fecal matter, healthy. Mesenteric vessels full; portal veins full; jugulars full.

Gall-bladder full.

Lungs slightly congested.

Right side of *heart* full of clot and fluid blood; left side empty.

General venous fulness in *brain*. Slight effusion in ventricles, membranes of brain slightly congested.

IX. *Poisoned a Large Male Cat with Tincture of Belladonna.*—Administered sixty drops of tincture of belladonna at 2 o'clock and 13 minutes P. M., June 10, 1853.

2h. 15m. Commenced frothing at the mouth slightly.

2h. 20m. Frothing at mouth increasing. Swallowing occasionally, quite uneasy.

2h. 28. Holding his head up and looking up toward the ceiling; sitting on hind legs. Had a profuse and seemingly involuntary discharge of urine. Frothing at mouth ceased; pupils dilated, anxious to crawl off into some secluded corner.

2h. 35m. Appears to be blind; pupils very much dilated, occasionally carries his head back and casts his eyes up towards the ceiling.

2h. 40m. Vomited about one-half drachm of greenish, yellow, watery liquid; in vomiting made a noise as if in pain. Held his head up and back for about one minute. Pupils much dilated.

2h. 45m. Vomited about ten drachms of matter like the last. Losing use of limbs. Vertigo, almost constantly, swallowing for the last five minutes.

3h. 9m. Has been constantly swallowing and walking about for the last fifteen minutes.

3h. 20m. Vomited slightly a greenish white fluid. Either sitting on his hind legs looking up or walking about.

3h. 30m. Drowsy. Slight twitching in different parts of the body.

3h. 40m. Administered sixty drops more of tincture. He did not swallow it all—probably not over forty-five drops. Immediately after this lay down and fell into a sleep, which lasted till 4 o'clock 35 minutes. Pupils excessively dilated, breathing rather heavy.

4h. 35m. Administered forty drops more of tincture. At 4 o'clock and 38m. became uneasy, walked about, occasionally mewing; vision indistinct, vertigo. This uneasiness and walking continued till 5 o'clock and 5m. when I administered forty drops more of tincture.

5h. 7m. Breathing laboured, rattling in bronchiæ; quite comatose.

5h. 10m. Aroused, very uneasy, mewing, walked about staggering. This continued till 5 o'clock and 20 minutes, when he sank into a sound sleep, breathing heavy, forty-eight inspirations per minute.

5h. 33m. Administered forty drops more of tincture. Two minutes after sank into a deep sleep. Breathing laboured, fifty-two inspirations per minute, heart beats ninety to the minute. Pulsations feeble, continued in this state till 5 o'clock and 58 minutes.

5h. 58m. Involuntarily passed urine. Heart almost ceased beating,

twenty pulsations to the minute, feeble, comatose, continued in this state till 6 o'clock and 15 minutes, when breathing ceased. Whole muscular system soft and placid.

Peculiar symptoms.—General laxity of the muscular system. Involuntary discharge of urine. Sitting on hind legs and gazing vacantly upwards. Peculiar rattling noise in bronchiæ for most of time. Excessive dilatation of pupils. Peculiar appearance of matter vomited. Losing use of hind legs first. Frothing at mouth, ceased about fifteen minutes after the first dose was administered.

Post-mortem 1 hour and 55 minutes after death.—General muscular flaccidity, general capillary and venous fulness. Whole length of intestines, from pylorus to anus, five feet and five inches. Length of small intestines fifty-three inches. Length of large intestines twelve inches. Length of stomach along the upper curvature eight and a half inches. Length of stomach along the lower curvature four and a half inches.

Stomach over twice as large as the stomach of the cat poisoned with aconite. Stomach filled with a white jelly. Mucous membrane slightly corrugated, almost white, no congestion perceptible, except in two or three small patches.

Duodenum lax and empty, no contraction or congestion.

Jejunum, mucous membrane mottled with small red spots, resembling in appearance the first stages of scarlatina.

The *ileum* the same in appearance as the jejunum. Both the jejunum and ileum contain traces of fecal matter.

The *cæcum*, *colon*, and *rectum*, healthy in appearance, and filled with fecal matter.

Liver very much congested.

Gall-bladder filled with dark-coloured bile almost black.

Lungs considerably congested, and filled with blood and frothy matter.

Heart empty.

Kidneys congested, which may explain the excessive secretion of urine.

Mucous membrane of *œsophagus* pearly white.

Mucous membrane of *fauces* and *mouth* covered with a little gelatinous mucus.

General fulness of vessels of *brain*, slight effusion in ventricles and congestion in membranes.

X. *Poisoned a Large Male Cat with Tincture of Stramonium.*—Cat full grown, and in fine healthy condition. Administered sixty drops of tincture of stramonium to it at 2 o'clock and 14 minutes, June 10, 1853. Had not eaten since four o'clock yesterday.

2 o'clock 16 minutes P. M. Commenced frothing slightly at the mouth, and two minutes after commenced sneezing and coughing.

2h. 23m. Vomited slightly a frothy liquid of a greenish yellow colour. Pupils dilating.

2h. 27m. Thrusts tongue out between teeth, and opens and shuts them upon it. Tongue red and apparently swollen, frothing ceased, anxious to crawl off in some secluded place; mewing.

2h. 36m. Had a discharge of urine, mewing and uneasy.

2h. 42m. Lying on chest and abdomen, quiet, perfectly conscious of what is passing. Slight vertigo, staggers when walking.

2h. 50m. Quiet, lying as if asleep, remained in this state till three o'clock, when he got up and walked around, mewing.

3h. 7m. Lay down with head between fore-paws, as if asleep. Remained in this state till 3 o'clock and 17 minutes. Woke up, uneasy, commenced walking about and mewing, continued in this condition till 3 o'clock and 30 minutes. Quiet and drowsy.

3h. 40m. Gave sixty drops more of tincture, swallowed most of it. Passed urine involuntarily two minutes after. Five minutes after walking stupidly around mewing, considerable vertigo; pupils dilated.

3h. 50m. Vertigo increases, can hardly walk; uneasy, dimness of sight, continued in this state till 4 o'clock and 5 minutes, when he became quiet, lay down and slept, breathing easy. At 4 o'clock and 15 minutes vomited slightly a small quantity of greenish gelatinous fluid, which aroused him.

4h. 20m. Became uneasy, walking about, mewing, running against objects, blind. At 4 o'clock and 30 minutes became quiet, and fell asleep.

4h. 35m. Administered forty drops more of tincture; about two minutes after involuntarily passing urine; became very uneasy, mewing constantly; quite blind; cannot walk without falling over from side to side, breathing laboured. This uneasiness continued till 4 o'clock and 50 minutes, quiet, apparently sleeping; pulse slow, heavy and feeble.

5h. Woke up very uneasy; endeavoured to walk about.

5h. 5m. Administered forty drops more of tincture. Two minutes after became quite comatose; breathing laboured. Five minutes after, aroused, anxious, mewing, unable to stand. Ten minutes after, comatose; lying on side; pupils very much dilated. Fifteen minutes after, moving around in a circle; mewing; sixty inspirations per minute.

5h. 33m. Administered forty drops more of tincture. Two minutes after, lying on side; comatose; breathing laboured; forty-eight inspirations per minute.

5h. 40m. Still comatose; legs in constant motion; the fore and hind legs on one side move together in same direction; motion alternate, first on one side and then on the other.

5h. 55m. Heart beats fifty to the minute; breathing heavy.

5h. 58m. Heart beats forty per minute; feeble; comatose.

6h. 15m. Comatose; forty inspirations per minute. Continued in this state till 6½ o'clock P. M.

6h. 30m. Administered thirty drops more of tincture of stramonium. After a short struggle, he fell down comatose; heart beating slow, heavy, and feeble; breathing heavy and difficult. Continued in this state till 7 o'clock and 6 minutes.

7h. 6m. Motion in limbs ceased; eight minutes after, slight motion, with an attempt to move limbs. Respiration ceased at 7 o'clock and 50 minutes. No rigidity of muscular system; whole body limber and flaccid.

Post-mortem 55 minutes after death.—No rigidity of muscles; limbs relaxed and limber; general venous fulness.

Jugulars distended with dark blood. *Mesenteric veins* gorged with dark blood.

Bladder full; walls thin and flaccid; no contraction.

Intestines distended with gas; presented a knotted appearance. Length of small intestine, fifty-eight and a half inches; length of large intestine, twelve inches.

Stomach from two and a half to three lines larger than the stomach of cats poisoned by tincture of aconite; slightly larger than the stomach in the belladonna case. *Mucous membrane* healthy; contents, about two ounces of a watery frothy mucus.

Duodenum filled with gas; healthy; contents, small quantity of food and bile.

Jejunum quite empty; slightly congested in spots and lines.

Ileum more congested than jejunum, but congested very slightly; contained small quantity of fecal matter.

Cæcum, colon, and *rectum* filled with fecal matter; healthy.

Kidneys very much congested, which may explain the excessive discharge of urine.

Portal veins filled with dark blood.

Gall-bladder filled with dark bile.

Lungs very much congested; filled with dark blood and frothy mucus.

Heart quite empty; venæ cavæ filled with dark blood, which contains considerable clot.

Œsophagus very white and pearly. *Pharynx* and *fauces* the same.

Brain slightly congested; vessels all full; slight effusion in ventricles; considerably congested in membranes.

XI. *Poisoned a Male Cat, about one-third grown, with Tincture of Conium Maculatum.*—At 3 o'clock 45 minutes P. M., June 10, 1853, administered forty drops of strong tincture of conium maculatum (U. S. P.) to a healthy male cat about one-third grown.

3h. 58m. Swallows occasionally, licks his lips, and opens and shuts his mouth.

4h. 3m. Slight vertigo; dumpish; swallowing occasionally.

4h. 13m. Vomited one-fourth drachm of white frothy matter; slight vertigo.

4h. 25m. Quite easy; walking about room, reeling slightly; pupils enlarged.

4h. 40m. Administered thirty drops more of tincture. Two minutes after, commenced frothing slightly at mouth; vertigo. Five minutes after, unable to walk but a few steps without falling; attempted to vomit.

4h. 50m. Unable to stand; lying on side; occasionally coughs; partially comatose. Three minutes after, aroused him; immediately vomited about three drachms of water and white frothy matter; walks with difficulty; falls every few steps.

5h. 6m. Fell asleep.

6h. 30m. Has slept most of time since 5 o'clock and 6 minutes; considerable vertigo in walking.

6h. 38m. Administered fifty drops more of tincture conium maculatum; immediately fell into a comatose state; breathed a few times, and expired at 6 o'clock and 40 minutes. Eyes glassy and sunken; pupils dilated.

Post-mortem 22 minutes after death.—No muscular rigidity. Blood unusually red, both in veins and arteries; arteries and veins equally full; capillary vessels filled with light, bright, red blood.

Bladder soft and flaccid; contains about two drachms of urine.

Length of small intestines, forty-one inches; length of large intestines, seven inches; no muscular contraction of either the stomach or intestines.

Stomach filled with a slimy, frothy matter or mucus; mucous membrane has a slight pinkish tinge; no corrugation.

Duodenum contains a small portion of slimy, viscid mucus, mixed with bile; slight pinkish tinge in spots; no contraction.

Jejunum quite empty, save a small quantity of mucus adhering to mu-

cous surface; mucous membrane has a light pinkish tinge in spots and stripes. *Ileum* same as jejunum. *Cæcum, colon,* and *rectum* filled with fecal matter, and healthy.

Kidneys healthy.

Slight congestion of *liver*. *Gall-bladder* filled with tarry, black, viscid bile.

Pancreas and *spleen* normal.

Lungs slightly congested towards inferior lobes; contain frothy mucus in air cells and bronchial tubes.

Heart empty. *Venæ cavæ* full of light-coloured blood, mostly fluid.

Œsophagus healthy.

Pharynx, fauces, and *mouth* covered with frothy mucus.

Brain and membranes quite normal in appearance, except that their vessels were full of peculiarly red blood.

XII. *Poisoned a Healthy Male Cat with Tincture of Hyoscyamus.*—Height of cat 7 inches. Length 15½ inches, exclusive of tail. Girth back of shoulders 11 inches. Administered seventy drops of the tincture of hyoscyamus at 10 hours and 5 minutes A. M. June 12, 1853. Only swallowed about sixty drops.

10h. 18m. Becoming quiet and stupid, pupils begin to dilate.

10h. 28m. Beginning to mew. Occasionally swallows at 10h. 35m. Lids of eyes nearly closed; pupils much dilated. Vertigo. Sits still most of the time.

10h. 45m. Breathing sluggish, rattling in bronchiæ. Noise in abdomen every time he breathes, like wind. At 10h. 48m. spasms of epiglottis with stiffness of jaws.

10h. 55m. Uneasy. Pulse sluggish. Vomited about one drachm of a greenish, slimy, watery fluid, after which became quiet and easy.

12h. 40m. P. M. Appears to be recovering. Occasionally mews. Eyes partially closed.

12h. 43m. Administered thirty drops more of tincture. Three minutes after attempted to vomit. Considerable vertigo. Swallowing, as if choking. Breathing laboured. Groans slightly.

12h. 50m. Pupils dilated. Commenced running backwards. Lower jaw drawn down almost constantly. Vertigo; dyspnœa. Pupils dilated. Rattling in lungs in breathing. Losing use of limbs. Apparently spasms of epiglottis.

12h. 55m. Almost constant disposition to run backwards. Under jaw drawn down towards chest, leaving the mouth open. Almost constantly in motion. Wheezing cough. Respiration difficult. Cannot walk without falling at almost every step. At 1 o'clock pupils very much dilated. Eyelids nearly closed. Breathing difficult and slow. Mouth open. Lying on side. Tail in motion. Recognizes nothing.

1h. 4m. Spasms of epiglottis. Paws his mouth. Under jaw drawn down. Breathing irregular, short and difficult. Pulsations irregular and feeble.

1h. 15m. Aroused. Attempted to walk, but could not; lost almost entirely the use of limbs.

1h. 55m. Quite comatose. Lying on side, breathing short and heavy. Rattling in bronchiæ.

2h. 20m. Occasionally an internal spasm; occasionally a mewing noise.

2h. 40m. Partially aroused. Occasionally when he moves the tendency is to move backwards.

2h. 44m. Severe spasms. Vomited about $\frac{1}{4}$ drachm of greenish watery fluid, after which he remained quiet and comatose till 4 o'clock.

4h. Partially aroused. Almost lost use of hind legs; drags them after him when attempting to walk. When quiet the nose is held close to the floor, between the paws.

4h. 5m. Administered twenty drops more of tincture. One minute after vomited, throwing it nearly all up. Bleeds slightly from mouth. Apparently in great pain. Vertigo and dimness of sight.

10h. Quite comatose; has been so since 4h. 6m.

7h. A. M., June 13th. Quietly sleeping when I left him last evening. Find him at 7 o'clock this morning in same position, still sleeping. Aroused him. Appeared in considerable pain when he moved. Attempted to have a passage from bowels. Only passed a few drops, which appeared to give pain. Very stupid. Very loth to move. Appeared stiff and sore in limbs.

11h. P. M. of June 13th. Lying in same position as at 7 A. M. Been comatose all day; can hardly be aroused.

7h. A. M., 14th. Comatose. Lying in same position as at 11 o'clock last evening. Breathing slow, irregular, and difficult. Mucous rattle. Pulse slow, irregular, and feeble. Has been affected with involuntary passages from bowels for some hours.

7h. 30m. Expired. A few slight spasms just before death. Body smells as if incipient decomposition had already commenced.

Post-mortem $4\frac{1}{2}$ *hours after death.*—Whole muscular system soft and flaccid. No distension of venous system with blood. Length of small intestines fifty-five inches. Length of large intestines eight inches. Outside of stomach, lower portion of liver and mesentery covered with effused biliary matter.

Stomach flaccid; no contraction; mucous membrane considerably congested. No effusion of blood. Empty, with exception of a small quantity of mucus adhering to walls.

Duodenum contains considerable biliary matter; slight congestion of mucous membrane; otherwise healthy in appearance.

Jejunum contains fecal and slimy matter, and bile in considerable quantity; walls thin; no contraction.

Ileum nearly empty; contains a small quantity of fecal matter and bile, with a little slimy mucus in the lower portion; no congestion.

Cæcum, colon, and *rectum* contain a small quantity of fecal matter, normal in appearance.

Kidneys somewhat congested. Portal veins full; blood dark coloured.

Gall-bladder quite empty.

Lower lobes of *lungs* in a high state of congestion; filled with blood and frothy mucus.

Right ventricle of *heart* full of blood; left ventricle empty. Venæ cavæ contain some clots; blood, however, mostly fluid.

Œsophagus congested in spots and coated with mucus.

General fulness of vessels of *brain;* slight effusion in ventricles; slight congestion of membranes.

XIII. *Poisoned a Dog with three grains of Veratria.*—Dog large, healthy, and about two years old. Length from crown of head to base of tail twenty-eight inches. Girth back of shoulders twenty inches.

At 12h. 10m. A. M. (a few minutes after midnight), June 17, administered to a large male dog three grains of veratria, dissolved in about sixty drops of alcohol.

12h. 13m. Began to shake his head and open and shut mouth, and run around, holding mouth close to floor, as if there was severe burning in mouth and fauces.

12h. 16m. Vomited about half drachm of white froth. Spasms of epiglottis. Paws mouth. Rubs mouth and side of head on floor.

12h. 22m. Spasms in throat intermitting with severe spasms of stomach and diaphragm. Constant wagging of tail. Slight frothing at mouth.

12h. 25m. Running his head into every crack and corner. Violent spasms in throat. Great dyspnœa. Opens and shuts eyelids. Eyes quite natural. Comes when called.

12h. 28m. Limbs weak; cannot walk without falling. Mouth wide open. Intermittent spasms of epiglottis; when spasms are on, breathing ceases; when spasms cease breathes with difficulty and with mouth open. The spasms and intervals last about two minutes each.

12h. 35m. When spasms are off breathes with mouth open, with the motions and noise of lolling; with the exception that respiration, instead of being rapid, is slow and laboured. Eyes wide open. Vertigo. Appears to be in great pain internally; a strong disposition to rest his abdomen on something. Partial paralysis of nerves of motion. Sensation still perfect.

12h. 45m. Severe internal spasms; also severe spasms of epiglottis or muscles about the throat. Not able to stand; pushes his body along on the floor by his legs. Gnashes or brings his teeth together suddenly at every inspiration; inspirations about twenty-five per minute. Groans; heart beats irregular.

12h. 50m. Recognizes when called; endeavours to approach; looks up wistfully, and wags his tail; severe intermittent spasms of epiglottis and muscles of respiration.

1h. Breathing very slow and difficult; gasping at every inspiration; about eight inspirations per minute.

1h. 10m. Severe internal spasms; severe spasms of muscles of throat; six inspirations per minute; gasping and rolling over occasionally.

1h. 20m. The same; considerable frothing.

1h. 27m. Severe spasms of the muscles of the throat and of the muscular system generally; lasted about one minute. Pulsation forty to the minute and irregular. Brings jaws together with considerable force occasionally. Mouth been wide open most of the time since poison was given. Opens and shuts eyelids quite regular and natural. Pupils sensible to light; eyes natural in appearance.

1h 40m. Spasms of epiglottis very severe; brings jaws together occasionally like a rabid dog; strikes his head on the floor with considerable force; while in spasms rolls and tumbles about; growls; eyes still natural.

2h. 25m. The same symptoms have continued increasing gradually in severity.

2h. 28m. Expired in a severe convulsion. Body up to fever heat.

Post-mortem 5 hours and 32 minutes after death.—Body warm; temperature 90° Fahr. Blood unusually red and fluid; no muscular rigidity. Arteries and capillaries more full of blood than veins. Jugulars not full. Mesenteric veins not full.

Bladder contained about one drachm of urine; loose and placid.

Stomach large; no rigidity; length at upper curvature seven inches;

length along lower curvature ten and a half inches; cross section in widest part four inches (walls intact and measured from middle of upper to middle of lower curvature). Mucous membrane of a leaden colour, excepting a small spot along the lower curvature, which was quite blue. No apparent congestion; small quantity of slimy mucus adhering to mucous membrane.

Duodenum slightly redder than usual; walls flaccid; mucous lining covered with viscid white mucus. Length of small intestine ten and a half feet; length of large intestine twenty-two inches.

Jejunum and *ileum* contain considerable fecal matter, healthy in appearance.

Cæcum, colon, and *rectum* healthy, and about half filled with excrementitious matter.

Considerable congestion of *liver*. *Gall-bladder* about one-third full of clear bile.

Left side of *heart* filled with clot; right side quite empty; blood unusually red.

Lungs considerably congested, and contain a small quantity of mucus. The *arteries* of lungs full of blood.

Œsophagus, pharynx, fauces, and *tongue* of a leaden colour.

XIV. *Poisoned a Large Cat with Six Grains of Picrotoxine.*—Dissolved six grains of picrotoxine in sixty drops of alcohol, and administered it to a full-grown and healthy cat at 10 o'clock and 58 minutes A. M. June 21st.

10h. 59m. One minute after swallowing the six grains, the cat went into the most violent and rapid spasmodic motions of limbs and body. He lay on his side; the legs moving backward and forward with a rapidity so great that you could hardly distinguish them. This rapid motion of limbs continued for about two minutes.

11h. 4m. When the motions became slower and slower, till at 11 o'clock and 4 minutes they had almost ceased; when frothing at the mouth commenced. Tongue hanging out of mouth; pupils very much contracted; appear like a black line.

11h. 6m. Expired without a noise. Did not make the slightest noise from the time the poison was given till death. The only marked symptoms were the very peculiar rapid spasmodic motion of the limbs, the frothing at mouth, and great contraction of pupils. Lived only eight minutes after swallowing the six grains of picrotoxine.

11h. 7m. Whole muscular system peculiarly flaccid and lax; lower jaw hanging loosely down; pupils now dilated to their natural size. Picrotoxine in this case has produced no persistent tonic muscular contraction.

Post-mortem 3 hours and 4 minutes after death.—Limbs limber and muscles lax.

Bladder quite empty. The lower portion of it, towards the neck, was very much contracted and rigid; the fundus thin and flaccid. Engorgement of mesenteric veins. Length of small intestines fifty-two inches. Length of large intestines fourteen inches; internal diameter of large intestines one inch; internal diameter of small intestines one-third inch.

Œsophagus healthy. *Stomach* slightly contracted, corrugated, and congested; contains small quantity of food; no effused blood.

Duodenum, jejunum, and *ileum* healthy in appearance; slightly contracted; contain fecal matter along the whole length. There is a tonic,

muscular contraction of the intestines in this case, similar to that produced by aconite, only to a much less degree.

Large intestines slightly contracted, and filled with air and fecal matter; healthy in appearance.

Liver slightly congested around edges; otherwise normal.

Gall-bladder quite empty; portal veins not full.

Lungs considerably congested, and filled with blood and mucus.

Heart filled with blood, partly congested. Large vessels full. Jugulars full. Engorgement of bloodvessels of the brain and its members; effusion in ventricles.

XV. *Poisoned a Large Female Dog with Picrotoxine.*—Dog healthy and in fine condition. Length from nose to base of tail thirty-five inches; girth back of shoulders twenty inches. Administered five grains of picrotoxine, dissolved in a few drops of alcohol, at 11 o'clock and 15 minutes A. M. June 21st. Endeavoured to get away as soon as poison was swallowed.

11h. 17m. Slight twitching of muscles and winking of eyes.

11h. 19m. Opening and shutting mouth; spasmodic twitching in muscles increasing; lolling and panting; looks anxious.

11h. 24m. Spasms of tongue; tongue rolls up when she runs it out of her mouth. Slight drooling.

11h. 30m. Apparently sees objects that do not exist; staring wildly at different parts of the room; spasmodic twitching increases in severity.

11h. 33m. Vomited frothy matter, with a little food.

11h. 35m. Constant panting, lolling, and drooling.

11h. 37m. Quite a severe spasm, which threw her on her side. The legs flew backwards and forwards rapidly for twenty seconds; then she jumped up as if nothing had happened.

11h. 38m. Another spasm like the first, lasting twenty seconds. Had a passage from bowels during the spasm.

11h. 40m. Another spasm more severe; lasted something over twenty seconds; after an interval of ten seconds there was still another spasm, during which there was a passage from bowels. The intervals between spasms are only about ten seconds. Intervals shortening, and spasms increasing in severity and length.

11h. 42m. Has had six severe spasms; quiet intervals very short.

11h. 44m. Very severe spasm; lying on side; head drawn back; legs in constant and rapid motion backward and forward.

11h. 50m. In almost constant spasms; passage from bowels thin and watery; during the short intervals lolls, pants, and looks frightened.

12h. M. Spasms have been decreasing in severity and frequency since 11 o'clock and 50 minutes. Spasms come on now about every minute, and last from five to ten seconds; constant lolling and panting; has made no noise from the first, and is apparently in no pain. In the intervals, recognizes when called.

12h. 14m. P. M. Administered five grains more of picrotoxin in a few drops of alcohol.

12h. 16m. Begins to slightly affect her.

12h. 18m. Spasms increasing in severity and in the rapidity with which they follow each other.

12h. 20m. Very long and severe paroxysm; limbs move with great force and rapidity backward and forward; snaps jaws together; gave one bark-

ing growl; pupils in severe spasms; very much contracted during spasms; in the intervals they dilate again to natural size.

12h. 38m. Yelped three times not very loud. The paroxysm which commenced at 12 o'clock 20 minutes is still on her.

12h. 50m. The paroxysm gradually passed off, and as it ceased she expired, which took place at 12 o'clock and 52 minutes.

Post-mortem 2 hours and 53 *minutes after death.*—Jugulars full. Mesenteric veins full. Venæ cavæ full.

Length of small intestines, eleven feet and two inches; length of large intestines, twenty-three inches.

Diaphragm very much congested.

Bladder healthy.

Stomach about half filled with food; mucous membrane slightly congested and corrugated; the congestion occurs in patches.

Duodenum contains a small quantity of alimentary matter; healthy in appearance, except a slight contraction.

Jejunum slightly contracted; contains shreds of meat and other alimentary matter.

Ileum slightly congested and contracted; empty.

Cæcum, colon, and *rectum* empty; emptied by the passage from bowels after poison was administered; contracted and corrugated considerably.

Liver healthy. *Gall-bladder* about one-third full.

Lungs highly congested and filled with blood and mucus.

Auricles and ventricles of *heart* filled with clot and fluid blood; engorgement of brain and its membranes, and effusion in ventricles.

XVI. *Poisoned a full-grown Cat with Tincture of Aconite.*—Administered sixty drops of tincture of aconite (U. S. P.) to a full-grown male cat at 6 o'clock P. M., June 17th.

6h. 5m. Commenced breathing short and laboured; vomited; severe spasms; had a passage from bowels.

6h. 7m. Breathing slow, laboured, and irregular; severe internal spasms; these continued at short intervals till 6 o'clock and 12 minutes.

6h. 12m. Became quiet; very weak; lost use of limbs; pulsation of heart feeble and irregular; gasping for breath.

6h. 14m. Spasms very severe; unable to stand; lying upon side with limbs all extended.

6h. 16m. Expired; death sixteen minutes after administering the poison. Vomited twice a little frothy matter.

Post-mortem 39 *hours after death.*—Muscles in a state of rigid tonic contraction. Length of small intestines, fifty-one inches; length of large intestines, thirteen inches.

Stomach partly filled with food; contracted; and mucous membrane congested. No effusion of blood except near the cardiac orifice.

Duodenum slightly contracted; otherwise normal.

Jejunum and *ileum* healthy in appearance; contain fecal matter; slightly contracted.

Large intestines slightly contracted and filled with fecal matter.

Liver healthy.

Bladder empty and contracted.

Extensive congestion of *lungs.*

Heart filled with coagulated and fluid blood.

Membranes of *brain* congested; congestion and effusion at base of brain; effusion in ventricles.

XVII. *Poisoned a Large Pregnant Cat with three and a half grains of Aconitia.*—The aconitia was very impure; probably not over one part in fifty was pure aconitia. Administered two grains of aconitia to a cat, June 18th, at 10 o'clock and 30 minutes P. M.

10h. 32m. Commenced frothing at the mouth, and swallowing.

10h. 33m. Vomited four drachms of food and frothy matter.

10h. 34m. Vomited again the same; slight vertigo.

10h. 36m. Severe internal spasms; effort to vomit.

10h. 38m. Severe spasms; losing use of limbs; partial paralysis of nerves of sensation and motion; passed urine.

10h. 40m. Dyspnœa; pupils dilated.

10h. 45m. Severe internal spasms; five inspirations per minute.

10h. 48m. Respiration very difficult.

10h. 49m. Severe internal spasms; eight inspirations per minute.

10h. 51m. Mucous rattle in bronchiæ; thirty short inspirations per minute; lying on side unable to move.

10h. 53m. Breathing very short and hurried; mucous rattle; about sixty inspirations per minute.

10h. 55m. Inspirations about seventy per minute; breathing short and hurried; mucous rattle; this state continued till 11 o'clock and 7 minutes.

11h. 7m. Severe effort to vomit; spasms severe.

11h. 15m. Respiration irregular; pulsation rapid and irregular. Continued in this state till 11 o'clock and 55 minutes.

11h. 55m. Raised herself and walked four or five feet, severe internal spasms.

11h. 57m. Fell upon side, breathing heavy and laboured. Mucous rattle in bronchiæ; gradually improved till 12 o'clock.

June 19, 12 o'clock and 20 minutes, A. M. Gave one-half grain more of aconitia. Lying on side quite stupid; breathing heavy and laboured.

12h. 25m. Endeavouring to walk; staggers and falls at every step. Limbs stiff and clumsy. Almost complete paralysis of nerves of sensation and motion.

12h. 40m. Lying on side unable to walk; breathing heavy and laboured. Left the cat for the night.

7h. 13m. Cat alive; but scarcely any use of limbs. Hind legs quite paralyzed. Pulse slow and feeble. Respiration feeble, but easy.

7h. 15m. Administered one grain more of aconitia.

7h. 17m. Attempted to vomit; threw up a little frothy mucus; after this sunk into a comatose state and remained so through the day and following night.

June 20th, 7h. A. M. Recovering. Hardly able to stand; almost complete paralysis of nerves of sensation and motion; apparently in no pain. Improved slowly through the day and following night.

June 21st, 7h. A. M. Able to walk with difficulty; labour pains.

June 22d, 7h. A. M. Severe labour pains.

9h. 10m. Gave birth to three kittens, two of which were dead. Kittens about half grown. Cat finally, gradually recovered.

XVIII. *Poisoned a Large Cat with Tincture of Aconite.*—Administered to large male cat sixty drops of tincture of aconite at 10 o'clock A. M., June 19. Cat healthy and in good condition.

10h. 5m. Begins to froth at mouth.

10h. 20m. Frothing at mouth and panting. No vomiting yet. Lying on chest and abdomen. Mucous rattle in bronchiæ; vertigo. Can hardly stand; limbs very stiff and rigid; but little control over hind legs.

10h. 30m. Very severe internal spasms; vomited a small quantity of mucus and frothy matter; appears to be in considerable pain.

10h. 35m. Vomited about three ounces of partly digested food.

10h. 40m. Very severe internal spasms, and lying upon side, unable to walk, limbs stiff and rigid.

10h. 45m. Severe pain, groaning and lying upon side in a deep stupor, constant muscular twitching.

11h. 8m. Violent internal spasms, after which he was quiet till 11 o'clock and 30 minutes.

11h. 30m. Comatose, lying on side, breathing heavily.

11h. 33m. Vomited about one and a half drachms of bloody frothy mucus, dyspnœa; after vomiting remained quiet till 12 o'clock and 14 minutes P. M.

12h. 14m. Very severe spasms (internal), groaning.

12h. 38m. Quite stupid scarcely able to move.

1h. Severe internal spasms; groaning; scarcely able to move a limb; sank into a comatose state, in which he remained till 3 o'clock and 18 minutes.

3h. 18m. Slightly improving in strength.

3h. 20m. Administered a drachm more of tincture of aconite.

3h. 45m. Gradually grew weaker till 3h. 45m., when he expired. Death took place in 5 hours and 45 minutes after administering the first dose of aconite. After death the limbs were stiff and muscles rigid.

Post-mortem 31 *hours after death.*—Muscles generally rigid. Jaws firmly set.

Urinary bladder contracted firmly on its contents; contains about one drachm of urine.

Stomach very much contracted, and mucous membrane corrugated and highly congested; covered with a viscid mucus tinged with blood; no other contents save a few small fragments the size of a pea, resembling clot; about half the normal size.

Duodenum very much contracted in length and diameter, and mucous membrane highly congested and covered with mucus tinged with blood.

Jejunum and *ileum* contracted in length and diameter, and mucous membrane congested and covered with mucus tinged with blood.

Cæcum and *colon* partly filled with fecal matter, thin and watery; contracted in length and diameter, but less than jejunum and ileum; mucous membrane slightly congested in patches.

Rectum filled with fecal matter; slightly contracted; otherwise healthy in appearance.

Gall-bladder about two-thirds filled with bile.

Liver congested around edges; portal veins full.

Lungs highly congested; especially so in the lower lobes.

Heart contains blood in both ventricles; much more in right than in left ventricle; mostly fluid. Venæ cavæ full of dark blood, mostly fluid. Jugulars full; mesenteric veins full.

Considerable congestion of the *brain* and its membranes, and effusion in ventricles.

Vessels of *kidneys* filled with blood.

XIX. *Administered to a healthy Dog, weighing* 35 *lbs., two drachms of a strong infusion of Tobacco, at* 1 *o'clock and* 13 *minutes A. M., June* 18.—Immediately on swallowing it commenced running around the room, lolling and breathing rapidly.

1h. 18m. Vomited about $1\frac{1}{2}$ ounces of food mixed with a little frothy mucus of a dark-brown colour.

1h. 27m. Vertigo. Vomited about half drachm of frothy dark mucus. Limbs getting weak. Vertigo.

2h. Vomited several times since 1h. 27m. Still vomiting. Very weak. Muscles almost powerless; cannot stand.

4h. Vomiting ceased. Strong disposition to sleep. Very weak; muscles all relaxed. Eyes sunken.

5h. Recovering strength; able to stand and walk across room. Gradually recovered, so that at 11 o'clock A. M. of same day, nine hours and forty-seven minutes after the infusion was administered, he appeared quite natural. This is the dog to which I administered the tincture of aconite per anum, previously mentioned; the aconite was given nine hours and fifty-two minutes after the infusion of tobacco was administered.

XX. *Administered to a Large Female Cat three drachms of Alcohol* (70 *per cent.) at* 11 *o'clock and* 27 *minutes, June* 21.—11 h. 30 m. Fell on side intoxicated. Passed water.

11h. 40m. Same as at 10h. 30m. Mouth open. Eyes like those of a drunken man.

11h. 50m. Lying on side. Raised head and mews when called. Muscles all loose and flaccid.

11h. 55m. Raised up on fore feet. Has a happy look: looks around and purs.

12, midnight. Walking about very cautiously.

12h. 20m. A. M. Quite lively; walking about room.

12h. 40m. Entirely recovered, with the exception of slight dulness. Left her for the night.

7h. 30m. Slight indications of the first stages of delirium tremens, otherwise quite natural, except a little prostration.

Killed the cat by fracturing skull with a blow from hammer, $7\frac{1}{2}$ o'clock P. M., June 17, 1853. Heart ceased to beat three minutes after. Passed urine while dying.

Post-mortem made 10 *o'clock A. M., June* 19, 38 *hours and* 27 *minutes after death.*—*Bladder* large, loose, and flaccid; quite empty. Length of small intestines forty-nine inches. Length of large intestines fifteen inches. Length of stomach from cardiac to pyloric orifice five inches; transverse diameter three and a half inches.

Stomach nearly filled with food; no congestion or corrugation of mucous membrane.

Duodenum healthy.

Jejunum and *ileum* contain fecal matter and chyle throughout their whole length; healthy.

Large intestines filled with fecal matter; healthy.

Lungs healthy; no congestion.

Heart contains a small quantity of clot and fluid blood. Other organs all normal in appearance.

XXI. *Administered two drachms of strong Alcohol to a full-grown Male Cat, June* 11.—He appeared to like it; licked his lips, and soon exhibited signs of exhilaration. He became more active and playful. Eyes brightened. In about fifteen minutes he began to stagger in walking, and exhibited a disposition to hunt. Kept moving about the room. Could perceive signs of intoxication for about an hour; after that became quiet and natural.

XXII. *Administered one drachm of Alcohol to a small Kitten, about half grown.*—In a few minutes it began to brighten up and appear more lively. One of its mates was brought into the room. The kitten that had taken alcohol sprang at its mate, scratched and bit it, and so frightened it that it fell over in a fit. The stimulant effect lasted for one hour, during which time it was very lively, and able to walk without reeling.

XXIII. *Administered to a Large Cat Four Drachms of Tincture of Aconite* (U. S. P.), *at* 10 *o'clock A. M., May* 23, 1854.

10h. 2m. Cat fell on side, swallowing, and choking and frothing at mouth.

10h. 3m. Severe internal spasms; vomited about one drachm of frothy matter; breathing short and laboured; eyes fixed and glassy; pupils dilated; unable to raise on feet.

10h. 5m. Internal spasms severe; vomited about two drachms of frothy matter and food; breathing becoming shorter, and more irregular and difficult.

10h. 7m. A severe spasm, during which vomited a small quantity of food and passed urine. Spasm lasted about one minute.

10h. 8m. Expired. Cat lived eight minutes after the tincture was administered. During the last five minutes he was in almost constant spasms.

Post-mortem 3 hours after death.—Muscles rigid; jaws fixed; urinary bladder empty, and contracted firmly into a hard ball.

Stomach very much contracted, and mucous membrane corrugated and highly congested in the region of cardiac orifice, where it was covered with a frothy mucus, tinged of a pinkish colour. Stomach contained about two and a half drachms of a darkish fluid, mixed with frothy mucus and small fragments of food.

Duodenum very much contracted; no congestion; contained about one and a half drachms of fluid matter, tinged with bile.

The *jejunum* and *ileum* were contracted, but no congestion; contents thin and watery. The *cæcum, colon,* and *rectum* were slightly contracted, and filled with fecal matter.

Slight congestion in lower lobes of *lungs* and in *diaphragm.*

Did not examine the *brain.*

Chemical examination.—Removed the stomach and intestines, and carefully separated the contents, which I placed with the stomach and intestines, cut fine in a large beaker glass, and subjected them to the process hereafter described for separating aconitia. I obtained a small precipitate in about thirty drops of slightly alkaline water, that communicated to the tongue the characteristic and persistent numbness. This precipitate I administered to a cat about two-thirds grown, by pouring it directly into the throat.

10h. 31m. This was done at 10 o'clock and 31 minutes A. M.

10h. 36m. Began to swallow and move about uneasily.

10h. 40m. Frothing slightly at mouth; eyes heavy; swallowing as if something was in the throat.

10h. 48m. Vomited about one drachm of frothy matter and food; slight vertigo; breathing heavy; spasms in throat, and in region of stomach and diaphragm.

10h. 55m. Lying on side; breathing laboured; internal spasms in region of stomach, which moved the sides; swallowing, passed urine.

10h. 59m. Vomited about one and a half drachm of frothy mucus, with a little food; after which appeared easier.

11h. 15m. Lying on side, breathing easier; no frothing at mouth.

11h. 35m. Still lying on side; breathing more natural; aroused him; he got up and walked across the room, and lay down again.

11h. 40m. Killed the cat with a blow on the head with a hammer.

11h. 57m. *Post-mortem.*—Stomach contracted, and mucous membrane corrugated and considerably congested; empty, with the exception of mucus adhering to the walls, and a few small particles of partially digested meat. Mucus not tinged with blood.

Duodenum contracted and congested; empty, except a small quantity of mucus, mixed with bile.

Jejunum and *ileum* slightly contracted; otherwise normal in appearance.

Cæcum, colon, and *rectum* filled with fecal matter, and quite normal in appearance. Other organs all healthy.

XXIV. *Poisoned a Large Healthy Cat with Four Drachms of Tincture of Aconite, January* 14, 1862.—Symptoms before death much like those before described. Vomited from four to five drachms of frothy mucus and food. Passed urine. Died in thirteen minutes after the aconite was administered. About quarter of an hour after death removed stomach and intestines, and subjected them to a chemical examination for aconitia, as follows: Placed the stomach and intestines, cut fine, with their contents, in a large beaker glass, and digested with alcohol for about one hour; decanted and added more alcohol, and digested again for about the same length of time; decanted and added a third portion of alcohol, and digested and decanted. Mixed the several portions of alcohol, and filtered through clean muslin; evaporated filtrate carefully at a low heat over a water-bath to the consistence of a thick syrup, dissolved in two ounces of distilled water; filtered; evaporated filtrate to the consistence of an extract carefully over a water-bath, and redissolved in one and a half drachms of distilled water, acidulated with SO_3 filtered; added to filtrate a strong solution of $KO\ CO_2$ in considerable excess, and set aside for precipitate to separate and subside. At first there was no appearance of a precipitate; after standing a short time the liquid became slightly turbid, and at the end of twenty-four hours quite a deposit had subsided. At the end of forty-eight hours found the precipitate had increased. Filtered, dried filter and precipitate between folds of Swedish filtering paper, separated as much of the precipitate from filter as I could scrape off, and this I preserved. The precipitate gave the characteristic taste and constricting persistent numbness of aconite on being applied to the tongue, and produced in the throat and fauces the peculiar secretion of viscid mucus.

REVIEWS.

ART. VII.—*A Practical Guide to the Study of the Diseases of the Eye: their Medical and Surgical Treatment.* By HENRY W. WILLIAMS, M. D. Boston: Ticknor and Fields, 1862. pp. 317.

A HANDBOOK upon diseases of the eye emanating from the press at the present day, should, in our opinion, possess two requisites. First, it should give a clear and succinct account of the pathology and treatment of the more common affections of the organ of vision; and, second, it should also sketch the results of modern investigation upon those more abstruse topics which of late years have been so successfully studied, chiefly by European observers. In short, it should combine such knowledge of the past as has stood the test of experience, with at least a comprehensive epitome of the discoveries of our own day. On these conditions alone, can it meet the wants of the student, or claim to be *au niveau* with the present state of ophthalmological science.

It is a lamentable fact that diseases of this class are, as a general rule, but little understood by the profession. Eyes, which might readily be saved, are lost under the care of physicians who, although abundantly able to cope with the ordinary diseases met with in general practice, are "at sea in a fog," when the delicate organ of vision is involved. It is such ignorance that prescribes cups, blisters, low diet, mercury and tartarized antimony for a wound of the cornea; that poultices the eyes of an infant afflicted with ophthalmia neonatorum until staphylomata form and burst, and the eyes are lost; that treats an anæmic patient suffering from granular lids and ulcerated cornea with a darkened room, slops and various depletive measures; that divides with the knife a vessel that reparative nature is sending out as a healing messenger to some ulcer of the cornea; and that profusely salivates and starves a patient with syphilitic iritis, already exhausted by disease and a dissolute course of life. These are a few of the many errors which, to our knowledge, have been committed by men holding a high position as medical practitioners; nay, who enjoy an extended reputation as surgeons; errors due in a great measure to the causes stated by our author in his preface, viz., the neglect of this branch of study at our medical schools, and the limited facilities for clinical observation of diseases of the eye, except in our large cities. For the sake of humanity, as well as the credit of the profession, such ignorance should be removed; and there is abundant room for a convenient text-book, so cheap as to be within the reach of all, and so free from technical terms as not to be repulsive, which shall teach the very first principles of ophthalmology.

Something more, however, is required to complete our ideal of such a work. The advance in our knowledge of the pathology and treatment of diseases of the eye, and the improvement in our means of investigation, within the last ten years, have been immense. No branch of surgery has been more successfully cultivated. To no subject can we turn with greater pride for evidence that the present generation has nobly fulfilled its mission of advancing upon the knowledge of its predecessors. Witness the in-

vention of the ophthalmoscope and the many lesions that its use has revealed to us. Observe the improvement that has been made in our treatment of glaucoma, an affection which ten years ago almost fatally condemned its victim to blindness, now successfully combated by a simple surgical operation. Recollect the vast labours of Donders, opening to us a field almost entirely new, as to the accommodation of the eye and its various lesions. Notice the superiority of the present mode of operating in strabismus compared with that formerly in vogue; the improved treatment of affections of the lachrymal passages; the successful application of iridectomy, not only to glaucoma, but to increasing staphyloma, recurrent iritis, etc.; the benefit of iriddesis in conical cornea and certain cases of opacity; the modern method of extirpating the globe, etc. etc. At present a satisfactory account of these various subjects can only be gathered from monographs or medical periodicals in our own and foreign languages. Many of them are so novel that they are not included in the standard works upon diseases of the eye; and yet they are so important that no one unfamiliar with them is fit to practice as an oculist. It is not, indeed, to be expected that a handbook, intended for the student and general practitioner should contain a full and complete account of them all; but it should furnish an epitome sufficient as a basis for farther study. No work which ignores the march of science, and which adheres to exploded theories and modes of practice, can be said to meet the wants of the profession.

The book before us possesses the advantages of a convenient form, great elegance of typography and ease of diction, and, when treating of some of the more common affections of the eye, is, perhaps, as full as could reasonably be expected in a work designed chiefly for students; yet we rise from its perusal with, on the whole, a feeling of disappointment, since in both of the respects above mentioned it fails to come up to our hopes and expectations. We propose to call attention to what we regard as some of its merits and demerits.

The first two chapters are devoted to the methods of examining the external and the deeper structures of the eye. In the third, we find some excellent precepts with regard to "remedies and their application." Our author justly protests against acetate of lead as an ingredient of collyria.

> "Solutions of the acetate of lead, sugar of lead as it is popularly called, formerly had a prominent place among collyria, and are even now extensively employed by some physicians, and especially by the common people. They should be banished from the list of ophthalmic remedies. In cases where they seem to be of service, the object can be better accomplished by other means which are not dangerous to the eye, as are all preparations containing lead. Where ulceration of the cornea exists, the solution of lead is liable to be decomposed and deposited in the texture of the cornea, forming an indelible opacity."

The following remarks are also excellent:—

> "Vessels should not be divided with the hope of cutting off a supply from a diseased cornea; such an expedient could only have been devised by a superficial observer; as in this case their development is the effect and not the cause of the disease, and, if certain branches are obliterated after incision, others are immediately developed in their place; whereas they all disappear after, but not before, the state of the cornea is improved by proper treatment.
>
> "Local depletion, to a moderate extent, is by no means incompatible with a general tonic treatment. Unloading the neighbouring vessels may relieve a passive congestion, the return of which may best be prevented by giving vigour to the general circulation.
>
> "Poultices, whether made *secundum artem*, or composed of the disgusting

ingredients so much in favour with the vulgar, are very rarely allowable in disease of the eye itself. If applied in conjunctivitis, or disease of the cornea, they tend to augment the discharge and to soften the corneal tissue, favouring the formation of ulcers and perforation by the relaxation produced by the constant application of heat and moisture.

"In traumatic injuries of the globe, we should be very sparing of our resort to active treatment. Non-interference should be the rule, except where positive indications are manifest. This point cannot be too strongly insisted on."

Chapter IV., upon "affections of the conjunctiva," contains much sound advice, which might be read with profit by the majority of practitioners of medicine. We are surprised, however, to find upon page 30, that catarrhal and granular affections of the lids are confounded, no distinction whatever being admitted between the two. We regret, also, that Dr. Williams should be so exclusive a partisan of the sulphate of copper in the treatment of the various forms of conjunctivitis and of granular lids; and nitrate of silver, when properly employed, is not deserving of the entire denunciation it here receives. A more liberal spirit would have led our author to have endeavoured to discover the precise indications which call for the exhibition of each of these two remedies. For ourselves, we are in the habit of treating cases of firm granulations, which prove exceedingly intractable under the use of the sulphate, with the crayon of the nitrate lightly pencilled over the everted lids, taking care to wash the part thoroughly with water before it is allowed to come in contact again with the cornea. Thus applied, it causes even less pain to the patient than a crystal of the sulphate; and the effect is much more satisfactory. Solutions of the nitrate of silver may also be used with the happiest effect in many cases of muco-purulent and purulent ophthalmia. One objection urged against them by Dr. W. is the discoloration of the ocular conjunctiva which they sometimes produce. Now, according to our own experience, this effect never follows, unless from the long-continued use of a solution dropped into the eye, without any precaution being taken to limit its action to the diseased surface. Hence we are not in the habit of intrusting the employment of this remedy to patients themselves, except in such cases as are constantly under observation, and then only for a limited period.

When speaking of gonorrhœal ophthalmia, Dr. W. remarks:—

"Should haziness of the cornea be observed, it will be well to maintain dilatation of the pupil by the use of a solution of atropia or of extract of belladonna, that hernia of the iris may, if possible, be prevented from occurring, should perforation take place."

This procedure, however, must be entirely ineffectual for the purpose, since it is a notorious fact that, no matter how great the mydriasis, the moment the aqueous humour is evacuated, the pupil contracts.

We are happy to see in the chapter upon "affections of the lachrymal organs," that our author, in accordance with the best authorities of the present day, condemns in toto the use of styles and tubes inserted through an artificial opening by the side of the nose, and advocates Bowman's method of dilatation through the natural passages, after slitting up the canaliculus. Bowman's method, however, as here described, is so emasculated, that its inventor would hesitate, we fear, to acknowledge it as his own. For instance, Dr. W. says:—

"Generally, the orifice (of the canaliculus) only needs to be enlarged, and this may best be done by inserting the point of a fine pair of scissors to the distance of about a line, and dividing the ring surrounding the opening by a quick stroke."

Mr. Bowman, on the contrary, divides the canaliculus "as far as the caruncle," thereby greatly facilitating the subsequent passage of suitable probes. Again, no inconsiderable advantage of Bowman's method is that any fistulous passages which may have formed speedily heal, and the patient is relieved in a few days from his deformity and from the flow of matter upon the integument. Dr. W., however, prefers to perpetuate the fistula, as we conclude from the following advice: "When fistula lachrymalis has already formed, previous to our seeing the patient, it is well to take advantage of the abnormal opening through the skin for the dilatation of the duct." With equal propriety might a surgeon dilate a stricture of the urethra through a perineal fistula.

In the following chapter, upon "traumatic injuries of the eye," Dr. W. remarks: "When the entire globe is involved in the injury, and suppuration ensues, its progress should be favoured by fomentations or poultices." Under such circumstances, we have found excision of the globe by Bonnet's method to be by far the preferable course, since it saves the patient several weeks of exhausting and agonizing pain.

In describing the operation of iriddesis for the relief of conical cornea (an operation, by the way, invented by Mr. Critchett, and not by Mr. Bowman, as stated by our author), Dr. Williams says: "The edge of the pupil is drawn through and allowed to form adhesions with a small puncture of the cornea;" whereas the great merit of the operation, as proposed by its author, is that the iris is seized and withdrawn "midway between its periphery and its pupillary margin," thereby leaving the pupillary edge of the iris entirely free.

In the section upon staphyloma of the cornea, we find no mention of iridectomy, as a most valuable means, in many cases, of arresting the progress of the protrusion and saving the eye.

As is well known to every one familiar with the current medical literature of the last few years, Dr. Williams is a strong advocate for the treatment of all causes of iritis without mercury—a method originating, we believe, with himself. In his earlier publications upon this subject he recommended the frequent use of instillations of a solution of atropine or belladonna, together with quinine and iodide of potassium internally, and opiates when required to allay pain. In his present work Dr. W. appears to have still farther simplified his treatment, by limiting the use of remedies to mydriatics and sedatives, the former being considered essential, the latter merely accessory. We are told, therefore, that in all cases of iritis the only treatment absolutely necessary is to keep the pupil dilated with mydriatics; which is equivalent to asserting that iritis, whether idiopathic, rheumatic, traumatic, or syphilitic, is a self limited disease, which will safely run its course, provided means be taken to prevent adhesions between the pupillary margin and the anterior capsule of the lens; and this, in fact, is the ground which Dr. W. confessedly assumes. The beneficial effect of mercury, according to our author, is only apparent; it happens to be given at the turning point of the disease, and thus obtains credit which is due to the *vis medicatrix naturæ*. The line of argument, however, advanced by Dr. W. to lead us to abandon a mode of treatment sanctioned by the highest authorities is little calculated to give us a favourable impression of the proposed innovation; since he holds up before us a bugbear in the use of mercury which has no existence in reality, provided of course that this agent be used according to the recognized rules of our art. Thus we read of "the infliction of the grave inconveniences and protracted convalescence often occa-

sioned by the free use of mercury," and of "cases where the pupil has become and remained obliterated by deposits, where mercury had been most lavishly, and, as would be thought, judiciously administered." Now that this is a fair picture of the treatment of the past, we freely admit; but that it at all represents the practice of any surgeon educated in the modern ophthalmic school, we emphatically deny. No well educated oculist of the present day would for a moment dream of giving mercury "lavishly" in this affection, or to the extent of depressing the vital powers. It is now universally admitted by the best authorities that the use of this agent should always be confined within the bounds of salivation; that the general health should at the same time be promoted, if necessary, by tonics; and that the pupil should be kept constantly dilated with mydriatics. How it happens that iritis is the only symptom of secondary syphilis that cannot be controlled by mercury; and what treatment should be adopted with a patient suffering from iritis and other syphilitic manifestations, we must leave Dr. Williams to settle with some writer on syphilis. But our objection to Dr. W.'s innovation does not rest on theoretical grounds alone. A few years since, through the kindness of some of the surgeons of the N. Y. Eye Infirmary, we had the opportunity of witnessing a faithful trial of Dr. Williams's method of treating iritis, in which it was evident that the disease was of much longer duration and was attended with more suffering than where mercury was employed; nay more, in several instances, in spite of the faithful use of atropine, dilatation of the pupil could not be maintained, adhesions formed to the capsule of the lens, and vision was seriously compromised. We feel justified, therefore, in saying, that in his remarks upon the supposed evils of the mercurial treatment of iritis, Dr. Williams does injustice to his professional brethren, and that his total proscription of this agent is dangerous and pernicious.

Let us not, however, convey an impression which we do not entertain. It is against the ultraism alone of Dr. Williams's remarks that we feel called upon to protest. We freely admit that traumatic iritis should, as a general rule, be treated without mercury, and this is in accordance with the practice of the best oculists of the present day. We believe also that many cases of idiopathic iritis are susceptible of spontaneous recovery without injury to the eye, provided the pupil be kept constantly dilated. Moreover, in rheumatic iritis we often find that Rochelle salts or colchicum serve a better purpose than the preparations of mercury. Nor would we for a moment undervalue the use of atropine in all forms of iritis. Indeed, on this point we are prepared to go a step farther than our author; and, instead of putting a drop of the solution into the eye "once, or, in severe cases, twice in the twenty-four hours," we are in the habit of following the German practice of repeating the instillation from three to six times a day; and we believe that Dr. Dixon, in his excellent manual upon diseases of the eye, is radically wrong in discountenancing the use of this agent. It is none the less true, however, that in iritis of syphilitic origin, the judicious employment of mercury is not only safe, but, in most cases, essential to a speedy and happy recovery; and, according to statistics collected by Graefe, syphilis is the cause of sixty per cent. of all cases of this disease.

We had marked several passages for comment in the chapter upon cataract, which our space will allow us merely to refer to. Such are the absence of any warning against discission in old persons; the implied admission (p. 147) that if more "convenient for the friends of the patient," a congenital cataract may be completely broken up at the first operation, and

the fragments of the lens thrust into the anterior chamber—a practice fraught with the greatest danger, and unwarrantable under any circumstances unless it be the intention of the operator to prepare the eye for linear extraction; the direction (pp. 151 and 163) "to divide the posterior as well as the anterior capsule," a procedure which we are taught by the best authorities most carefully to avoid; and the antiquated "rule that one eye should not be operated on so long as the other exhibits no sign of disease."

In the chapter upon artificial pupil, an operation (iridodialysis) is described which is now regarded as wholly inadmissible.

Dr. W.'s description of the symptoms of glaucoma is extremely imperfect, and he states that the object of iridectomy in this disease is "to establish a free communication between the anterior and posterior chambers;" as though such communication did not already exist. In this chapter also we find a doctrine perhaps the most dangerous of any taught in the book, viz., that surgical interference is advisable in glaucoma, "unless, as we sometimes observe, the symptoms are promptly arrested by measures for the improvement of the health of the patient." If an operation be delayed for this experiment to be made, the golden opportunity will, in most instances, be lost.

In no department of ophthalmology has modern research been productive of more important discoveries, or conferred a more lasting benefit on humanity, than in the affections of the adaptive power of the eye. The results of the unrivalled labours of Donders, first given to the world in the *Archives of Ophthalmology* for 1858, and quickly translated into every modern language, are now recognized as affording the only satisfactory elucidation of a subject previously slighted by many, and misunderstood by all. It is with feelings of surprise and regret that we observe that Dr. Williams has completely ignored the march of science in this respect, and has recorded his adhesion to theories long since demolished.

We have but space to refer to a few of the most prominent errors. Our author says that "in ordinary eyes about sixteen inches may be regarded as the point of most distinct vision. Any great variation from this focal distance constitutes long or short sightedness." Yet how many an individual of middle age can read with perfect ease at sixteen inches, and is yet obliged to use a concave glass of perhaps twenty or twenty-four inches focus for distant objects. And how many another, of similar age, can read ordinary type at sixteen inches, but has lost the power of making out finer without glasses. The one is myopic, the other presbyopic, though the definition of our author would exclude both from these categories. The mistake consists in using the position of what is commonly called the "near point," or the nearest point to the eyes in which the patient sees with distinctness, as the standard; any variation from which constitutes an anomaly of refraction. It has been established that the distance of the *far point* is the only safe basis of classification. And we no longer speak of myopia as opposed to presbyopia, for, while the former (except when due to posterior staphyloma) is an anomaly of refraction—congenital or acquired, the latter is a sure consequence of advancing years, as much so as gray hairs, and liable to befall all but those extremely myopic. Myopia, with the exception just mentioned, and its opposite, hypermetropia, are anomalies of *refraction;* in the former the eye, when all accommodative effort is relaxed and its far point in consequence adapted for, can receive only *divergent*, in the latter only *convergent* rays. The one requires a concave, the other a convex glass for *distant* objects. Presbyopia is an anomaly of accommodation,

a loss of elasticity of the crystalline lens, which requires to have its refractive power increased by adding a convex glass to the eye for *near* objects. It may occur as well in a moderately myopic as in a hypermetropic eye.

Our author makes no reference to the method, now in common use, for expressing the amount of myopia, hypermetropia, or presbyopia present in any given case; no mention of the exceedingly simple as well as practical plan originated by Donders for denoting the range of the accommodation; no allusion to the great weight this range of accommodation in any given case ought to exercise on the choice of glasses for that patient. One word in this connection. "When possible," says Dr. Williams, "any one desiring glasses should go in person to select them from the establishment of a good optician." It seems hardly credible that a practitioner of such large experience should be willing to recommend a course that every day shows us to be followed by such disastrous results. As well apply to an apothecary for medical advice, or a sexton for spiritual consolation.

Dr. Williams says, referring to myopia, "Where persevering and continued efforts are made to obviate the defect by proper training, very much may be gained in focal distance." Modern investigation shows this statement to be absolutely groundless. We admit that, as in the case of patients operated upon for cataract, practice may aid in overcoming the effect of circles of dispersion; that the eye may gradually get more and more used to the imperfect images formed on its retina, and partly learn to accept an imperfect image for a clear one; but this is all. The process is mental, not optical. The image is projected on the retina, not a whit the clearer, after ten years of unflagging training, than it was on the first day. Let Donders speak on this point. "Diminution of myopia," says the Utrecht Professor, after referring to his records of fifteen hundred cases, "diminution of myopia I have never observed, either in the youth or adult, except in those rare cases in which myopia is caused by spasm of the accommodative apparatus, and no simple anomaly of the refraction or accommodation existed. In old age myopia very seldom diminishes." (*Archiv für Ophthalmologie*, vol. vi. part 2, page 221.)

The chapter expressly devoted to the ophthalmoscope, and the allusions in various parts of the work to the lesions discoverable by means of this instrument, are so meagre and imperfect, that we fear they could hardly have emanated from one practically acquainted with one of the most important inventions of our day. The limits of this review will only permit us to call attention to the important omission of any notice of sclerotico-choroiditis posterior, resulting in posterior staphyloma, and the immediate cause, in very many cases, of myopia. We would also remind our author, in this connection (see p. 13), that it is not a "convex lens of two inches radius," but one of two inches *focus*, that is commonly employed for obtaining a reversed image of the fundus oculi.

It would have been a more pleasant task to have said nothing except in praise of the present work, but we have felt obliged by the duty which every medical reviewer owes to the profession to point out defects so glaring as the above. We trust that our criticisms will be received in the kindly spirit in which they have been intended, and that another edition of Dr. Williams's book will leave nothing to be desired to make it worthy of his high reputation and of American ophthalmology.

In justice to the publishers, we must add that it is the most beautiful specimen of typography that we recollect to have seen in any medical work published in this country. A glance at the title page explains its elegance; it comes from the "University Press at Cambridge." B.

ART. VIII.—*Health and Disease as influenced by the Daily, Seasonal, and other Cyclical Changes in the Human System.* By EDWARD SMITH, M.D., LL. B., F. R. S., Assistant Physician to the Hospital of Consumption and Diseases of the Chest, Brompton; Physician to the Dramatic College; Corresponding Member of the Académie des Sciences, Montpelier, and of the Natural History Society of Montreal. London: Walton & Maberly, 1861. 8vo. pp. 409.

Health: its Friends and its Foes. By R. D. MUSSEY, M. D., LL. D., late Professor of Anatomy and Surgery at Dartmouth College, N. H., and of Surgery in the Medical College of Ohio; Fellow of the American Academy of Arts and Sciences, etc. etc. Boston: Gould & Lincoln, 1862. 8vo. pp. 368.

THE valuable and suggestive work of Dr. Smith particularly commends itself to the student of biology. It has been written, as we learn from the preface, "with a view to supply a deficiency which exists in medical literature, and to offer the results of a series of inquiries in aid of our knowledge on the two functions of the medical practitioner—the preservation of health and the treatment of disease." These inquiries have been made by the author upon himself and others, both in health and disease, and have been prosecuted almost without intermission through a period of six years.

A work in which are described the cyclical changes occurring in the human system, and the influence exerted by season in reference to the causation and treatment of disease, cannot fail, if properly executed, to be a most important addition to the literature, not only of physiology, but also of practical medicine.

Very little reflection is needed to show that an inquiry at once more important and complex than this can scarcely be found in the whole range of medical and physical science.

The complexity of such an investigation arises from several causes, and in proportion to its complexity is the uncertainty that must, for the present at least, attend its practical and beneficial applications. But the importance of these applications is equal if not paramount to the difficulties which beset the whole study, inasmuch as they are among the most prominent of those hygienic means to which the physician philosophically resorts in order to prevent disease rather than to attempt its cure by the employment of certain isolated and empirical formulæ.

In the great problem, to the solution of which Dr. Smith has devoted himself with such praiseworthy zeal, several factors are given, each in a state of activity at the same time, to determine their relation. These factors are the healthy cyclical changes occurring in the body of man, the cause and treatment of, and the mortality from, disease on the one hand, and certain constant atmospheric changes, &c., on the other. If all or either one of these factors were simple, the investigation would be very much simplified, and consequently rendered far more certain in its results. But unfortunately for the student they are compound; each one being made up of a number of associated elements.

Take, for example, the mortality from disease. Instead of being simple, this is in reality a compound element. A dozen cases of a certain disease —scarlatina for instance—may die from as many different causes. The

specific malignancy of the malady falling upon and poisoning the nervous centres may produce death, during the initiatory fever, either by convulsions or coma. Or the fatal termination may be caused by a phlegmasial attack, either of the brain, lungs, or some of the abdominal viscera. The deathward path, for some of the patients, may lie through general debility, whether superinduced by depressed or lessened vitality, or by some wasting, purulent discharge. Finally, some of the cases may die from the peculiar renal dropsy of this exantheme. Now it is within the experience of every observant physician that the climatic condition which would hasten death by one of these modes, would retard it in another. Hence, if we content ourselves with merely recording the mortality from scarlet fever, during a given time, without reference to the immediate cause of death, in one column, and opposite to it, in another column, the thermometric, barometric, hygrometric, and other conditions of the atmosphere for the same time, we must necessarily be led into error, or, at least, arrive at results so restricted and uncertain in character, as to be of but little use. This is one source of fallacy, which, as far as we can find, is invariably overlooked.

Again, the mortality from disease is complicated by another series of conditions, whose positive value yet remains to be established, viz., age, sex, height, weight, habits, modes of living, &c. This statement also applies to the cause of disease, and to the normal or healthy course of life in man.

The climatic conditions which influence the body of man in health and disease are numerous, and, within certain limits, constantly varying in combination and intensity. Necessarily, therefore, their influence is a fluctuating one. As these conditions or elements of climate—light, heat, electricity, moisture, atmospheric pressure, &c.—are always associated, it is very difficult to arrive at even an approximate estimate of the power of each one, or even of the exact relation which each one bears to the other in that series.

The science of climatology is of very recent growth. Indeed, the men who have given to the study its scientific character belong to the present day. Humboldt, in the admirable researches upon the causes of the inflections of the isothermal lines, recorded in his *Asie Centrale;* Dove, by his inquiries into the laws of the rotation of the winds; Boussingault, in his *Economie Rurale;* Kæmtz and others have all contributed largely towards reducing to a few systematic and comprehensive generalizations the mass of statistics which have been so rapidly accumulating during the past few years. But notwithstanding the extensive and laborious observations of many of these eminent physicists, so much that is still in doubt remains to be generalized and reduced to simple expressions or laws, that we must still regard as true the remark long ago made by Mason Good: "Of all the subdivisions of general philosophy," said this writer, "there is none so little entitled to the name of science as meteorology."

That the innumerable facts and details of disease have not yet been reduced to their fewest and simplest expressions, none who are at all conversant with theoretical and practical medicine will deny. Never will there be created a philosophy of pathology—we use this term in its most comprehensive sense—a philosophy in whose domains will be found the solution of such great questions as the unity or specific diversity of disease, the relation of constitutional and local disease, &c., until the numerous and ever varying phenomena of the healthy organism are reduced to a regular and well defined system, in which the relation, power, influence, and cyclical variations of each and every functional act are clearly understood.

From the tenor of these remarks it must be manifest that the satisfactory study of any one of the many questions that are involved in medicine and climatology must be very difficult, in consequence of the numerous and variously associated elements which enter into and complicate these questions. Unable as we are to assign a true and positive value to each of these elements individually, simply because we cannot isolate them, how much more difficult must appear the attempt to demonstrate the relations of the two groups—the attempt to explain a series of protean and ill-understood phenomena by another with which we are no better acquainted—in short, to explain the complicated phenomena of normal and aberrant vitality by the equally complicated phenomena of climate.

Calling to his aid experiment and observation, Dr. Smith, in the treatise under notice, addresses himself to the accomplishment of this task with marked ability.

The first chapter of his work contains an interesting account of the daily fluctuations in the rate of the pulse and the functional activity of the lungs and the kidneys, during the use of ordinary food and during fasting. The method employed in the prosecution of the scientific researches here recorded, and the important results obtained, should be carefully studied by the medical practitioner. After noticing briefly the well-known investigations of Kiell, Robinson, Falconer, Quetelet, Knox, Guy, and others upon the pulse, our author says:—

"These varied and numerous inquiries have afforded much information, but were deficient in that they did not in any case embrace the whole cycle of the twenty-four hours, and were not made under conditions so precisely parallel that they could be advantageously compared with each other, and hence it was desirable to make such a new series of observations as by their duration, the number of persons under observation, the uniformity in the conditions of the inquiry, and the extreme regularity in the period and mode of making the observations, should afford complete cycles and conditions which should render the results entitled to credit. To this end two sets of inquiries were set on foot, one in reference to health, and the other in cases of phthisis, the former embracing hourly observations on five persons, including children, and extending over three days and nights; and the latter on six adults of both sexes, extending over six days and nights without intermission. The general conditions imposed were precision in the hours of meals and of rising and retiring to rest, absolute rest during at least five minutes before each inquiry, and rigid attention to the hour, to the order of the cases, and to the method of counting and registering the rate of the functions. The posture selected was that of lying, since that alone was possible during sleep, and it is important to bear in mind that a considerable addition to that rate must be made if we would ascertain the rate in the sitting and the standing postures; but for the purpose of showing the progressive changes throughout the day either of the postures uniformly maintained is of nearly equal value. The true effect of posture and its variations during the day was determined by a third series of inquiries, in which the rate in each posture was determined at four periods of the day in several persons in health, and at 8 A.M. and 4 P.M. in fifteen phthisical persons during the space of a month."

Following the method of research above indicated our author has arrived at certain conclusions which are strikingly exhibited in a series of tables and diagrams. From these we learn that the rate of both pulsation and respiration was increased during the day and decreased during the night, that these changes did not occur abruptly, but that there was a period of increase in the morning and of decrease in the evening; that the amount of depression in the rate of the pulse in relation to the greatest elevation varied in different persons, but not in any definite relation to age, for whilst in the elder of two

children examined the greatest rate was $\frac{1}{2.9}$ more than the least rate, in the younger it was $\frac{1}{4.6}$; whilst in adults it was $\frac{1}{4.1}$ and $\frac{1}{4.5}$; and in the author himself $\frac{1}{5.8}$; that in reference to the rate of respiration there was a progressive decrease in this proportion as age advanced, the increase of the maximum over the mininum being in the order of age; that the variations in the rate of the pulse were greater during the day than in the night, in the former three or four marked elevations alternating with an equal number of depressions; that the periods of lowest pulsation during the day were commonly 8 A. M. and midday; and that the average increase per minute in the rate of respiration was, after breakfast 4.4, dinner 2.1, and tea 2.1, and of pulsation 15, 12, and 6, in the same order. Dr. Smith also found that the increase in the rate of respiration at breakfast was sometimes more than $\frac{1}{3}$, but it was less than that amount at dinner. Sometimes at both dinner and tea no increase was observed. During the act of eating an increase took place which disappeared in the intervals of the courses. This temporary increase was often as high as from twelve to fifteen pulsations per minute. The greatest increase observed in adults was twenty-three pulsations per minute, though the effect of eating was much less pronounced in them than in children.

The general course of the daily cycle of pulsation and respiration is thus summed up by our author:—

"In the evening, from 7 to 9 P. M., there is an evident tendency in the rate to decline, and with some slight variations this is continued progressively through the following hours until from 1 to 3 A. M., when the rate is at its minimum. During the next two hours there is a slight tendency to increase, but it is very gradual until the usual hour of rising, when it will have attained an increase of several pulsations per minute. Immediately after the breakfast has been taken there is a rapid and great increase, which attains its maximum in the second hour afterwards, after which it declines greatly in an hour, and loses from ten to fifteen pulsations immediately before the dinner. After the dinner has been taken there is another increase, but the rate is seldom raised so high as that which follows the breakfast, and the highest point is attained in the second or third hour. This again is followed by a decrease which precedes, and a subsequent increase which follows the tea, when a point as high as that which follows the breakfast is usually found; and lastly, there is the final decrease, which is usually progressive, notwithstanding that supper may be taken at a later hour. When dinner had been taken at a later hour than that above indicated, the rate of the functions followed the same course as that now given, except that there was not any important increase after mid-day until the dinner hour. The rate remained low, but not uniform, from 12 to 1 P. M. until the dinner hour.

"The extreme difference was sometimes thirty pulsations per minute, and was the greatest in the children.

"The ratio of the two functions varied with each hour of the day, but was the highest during the day, and the lowest during the night.

"The ratio is dependent rather upon respiration than pulsation, so that the high ratio of the day is due to the fact that whilst the rate of both functions is then increased, that of respiration is increased disproportionately. The extremes were as 1 to 2.9 and as 1 to 5.7, or the larger was double the smaller ratio; but there was no ratio nor any progression of ratios which was absolutely uniform on consecutive days.

"The effect of posture is very different in different persons and at various times, both of the same and different days, so that averages give but a very imperfect view of the result." * * * An inquiry was made upon four persons on three successive days in October, at 8 A. M., mid-day, 5 P. M., and 8 P. M.

"In both the children (examined) the effect was much greater at 8 P. M. than at any of the other periods, and particularly the effect of the standing posture, whilst in the adults the converse was observed. In one of the children the

increase before the dinner and the supper was much greater than that before the other meals, whilst in the elder child the effect of the standing posture was the least before the dinner, and that of the sitting posture the least before the breakfast. The younger of the two adults was affected by posture to a greater extent than even the children, and at the same time the results were far more uniform than those obtained from the latter. The progression in the decrease as the day advanced was very striking in that case. Thus the increase in the sitting posture was 12, 9, 7.3, 3.5, and in the standing posture 27, 14.6, 12, 10 pulsations per minute as the day advanced. The increasing effect upon the rate of respiration in the children in the evening was quite as great as upon pulsation, whilst the decreasing effect was equally well marked in the respiration of the younger adult, in whom, indeed, the effect of posture upon the rate of that function was then almost entirely lost."

In phthisical patients Dr. Smith discovered the same progression in the phenomena of pulsation and respiration as that recorded above for healthy persons, but the extrèmes are much greater. The total rate of the functions, he informs us, was higher, the difference between the rate in the day and the night was much greater, and oftentimes more than forty pulsations per minute, and consequently an increase of thirty-five to forty pulsations per minute was commonly found after breakfast. In women the rate was observed to be more uniform, and the depression of the night was greater than in men.

"Hence, in reference to pulsation the only remarkable difference between health and phthisis is the extreme variation in the latter of the night and the day rate, with, as a consequence, the signal increase in the morning and the decrease in the evening; but in reference to respiration, the singular fact was noticed in most of the cases, that the rate increased in the night in a most evident manner, and fell in the morning on waking, so much sometimes as twelve to fifteen respirations per minute. On the whole average of the women, the increase in the number of respirations was nearly seven per minute from 10 P. M. to 11 P. M., when they fell asleep, and that there was an average, though a less increase, until 6 or 7 A. M. The average increase in the men was 1.7 per minute from 10 P. M. to 11 P. M., and four per minute at midnight, from which hour the increase gradually subsided."

The next series of inquiries to which our author directs attention were undertaken to determine the hourly variations in the amount of carbonic acid expired and the quantity of air inspired.

Investigations of this character have been made and recorded by Coathupe, Prout, Scharling, Vierordt, and others. The results arrived at by these experimentalists are too well known to the physiological reader to need any reference here. Coathupe and Prout sought the percentage amount only of carbonic acid in a few cubic inches of expired air. Vierordt noted the hour of his observations, but did not undertake to determine the variations from hour to hour. Dr. Smith instituted an extended series of inquiries upon four gentlemen, aged severally 26, 33, 39, and 48 years, during the 18 hours of the working day, and upon himself in the hours of the night. In two sets of these experiments the quantity of carbonic acid was collected during ten minutes at the commencement of each hour, and also of each half hour following the meals; whilst in two others, the whole carbonic acid evolved was collected without intermission, except during a few minutes when food was taken. In the two former, the experiments were uniformly made in the sitting posture, but in the latter the sitting or the standing posture was adopted at indicated periods.

In conducting these experiments our author's method was to collect all the carbonic acid evolved from the lungs by breathing over a solution of

caustic potass which occupied the floor of several chambers of a box of gutta percha, and offered so extensive a surface that the whole of the carbonic acid was absorbed during the act of expiration. A detailed description of the apparatus employed would occupy too much of our space; we must, therefore, refer our readers for it, and the illustrative figures accompanying it, to the work itself.

The results obtained by Dr. Smith in this field of his inquiry are thus recorded in his own language:—

"In experiments made to determine the amount (of carbonic acid) evolved under the influence of not very profound sleep, it was found to be 4.88 grains and 4.99 grains per minute, at 1 and 3 A. M.; but we estimated the amount at 4½ grains per minute in profound sleep. Hence, commencing at from 1 to 3 A. M., the period when the lowest amount of carbonic acid is evolved (4.88 and 4.99 grains with sleep, and 5.7 and 5.94 grains when scarcely awake), it was found that there was an increase at about 6 A. M., when it amounted to a little more than 6 grains per minute, and at 7 A. M., after rising, to 7 grains per minute. The effect of the breakfast was to cause a total increase of 2½ to 3 grains per minute, in from one to two hours, followed by a decrease of 1 to 1½ grains per minute before the dinner. There was commonly an increase after dinner of about 1 grain per minute, and usually a decrease from that period to the hour of taking tea; but on some occasions, as on March 12, the quantity remained high until after the tea had been taken. After tea there was again an increase of from 1 to 1½ grains per minute, and the highest point of the day was attained. At about 7 o'clock a fall began to occur, and the decline progressed to the extent of 2 or 3 grains per minute at the hour of bedtime, but sometimes after supper, the quantity remained somewhat elevated until a later hour. After retiring to rest, at 11 o'clock, the quantity fell steadily until 1 to 3 A. M., when the minimum was attained.

"Hence there were commonly 4 minima and 3 maxima in the daily quantities of carbonic acid evolved, the former found immediately before each meal (except supper) and during the night, and the latter following each meal. The largest increase commonly followed breakfast and tea, and then the total quantities evolved were nearly identical, whilst there was also a great similarity in the minimum quantities recorded at the end of the intervals between the meals. This variation was due to food, but there was a low point below which the quantity did not fall. The highest amount of this variation was from one-third to one-fourth of the whole quantity evolved. There was not any hour of the day in which the evolution of carbonic acid was stationary, except in the hours immediately preceding the breakfast."

With regard to the quantity of air inspired, Dr. Smith found that there was a general concurrence in the progression of the quantities both of the carbonic acid expired and the air inspired. In himself, and three other persons, he discovered that the proportion of the carbonic acid to the quantity of air inspired at rest was 1 grain to 58 cubic inches; 54.8 cubic inches; 58.5 cubic inches; and 54.7 cubic inches respectively.

From the foregoing statements it will be seen that, in the cycle of the day and night, the phenomena of the pulse, respiration, inspiration of atmospheric air, and the evolution of carbonic acid, exhibit a remarkable uniformity in their fluctuations, and in the manner in which they are influenced by food and the digestive act. To complete the picture of this physiological cycle, an inquiry into the amount of urea discharged from hour to hour during the day is required. To this inquiry we find that our author has also addressed himself with the effect of arriving at some novel conclusions.

Finding that no reliable experiments had been attempted to determine the hourly variations in the urea and urine, he commenced a series of in-

quiries upon himself in the beginning of 1860, and continued them on nearly every day until March, 1861, with a view to show the variations of urea and urine, hour by hour, under noted conditions. This resulted in the determination of the total quantities of the twenty-four hours of the day and night, separately, of the quantity secreted before breakfast, after the night urine had been passed, of the quantities to twelve mid-day, and during each two hours in the afternoon, and, lastly, of the quantity evolved at each quarter of an hour after the breakfast and an early dinner on different days. At the same time the fluid and solid egesta were duly determined.

After mentioning that the least quantity of urea discharged per hour was through the night and immediately before breakfast, Dr. Smith says:—

"Immediately after breakfast, consisting of one pint of coffee, with bacon and bread, there was a most rapid increase, so that between 9 and 12 A. M., the quantity increased from 10 or 15 grains to 25 or 30 grains per hour, and from 12 to about 2 o'clock, the greatest amount of the day was evolved. At 4 or 6 P. M., the quantity had declined 5 to 10 grains per hour, and the decline commonly continued progressively until the night minimum was attained, but sometimes the quantity remained high until late in the evening. Hence the greatest amount of urea evolved per hour is in the early part of the day, and as the day advances the amount declines, whilst the lowest amount of the 24 hours occurs during the night hours. The maximum period of the day is about, or soon after mid-day, and the ascent and descent in the quantity are very rapid. A second increase occurred at 6 to 8 P. M.

"In these experiments it is important to bear in mind that the breakfast was a good one, and was followed by a moderate and simple dinner, without wine, at about 2 P. M., 14 oz. of tea at 5 or 6 P. M., and 15 oz. coffee, each with bread and butter, at 9 or 10 P. M. Hence, it was evident that the larger evolution of urea neither corresponded with the amount of nitrogenous matter taken in the previous meal, nor with the exertion made, but rather with the degree of activity of the vital processes. When, however, an unusually large or unusually late dinner was taken, with more than an ordinary quantity of wine, the proportionate amount of night urea was considerably increased, and the increase was carried on to the following day.

"When the food and fluid are fairly distributed over the day, as is the case with the masses of the people in all countries, there can be no doubt that the largest hourly excretion of urea occurs before 2 P. M., and thence forward there is a slow but not uniform diminution to the minimum of the night. * * *

"The quantity of urea evolved in each ounce of urine varies with the quantity of water evolved, and diagram No. 6 shows that the quantity per ounce is the inverse of the quantity per hour. Thus, in the morning hours, with sudden and great increase of the urea per hour, there is a great decrease of that substance per ounce, and as the day advances, the quantity per ounce increases as the quantity per hour decreases. The opposition of the two sets of curves is most striking, and it not uncommonly occurs that the hour of highest elimination of urine is that of the smallest quantity of urea per ounce. * * * * * *

"The quantity of water evolved per hour is the least during the night, and commonly there is a small increase before the breakfast in the morning. After breakfast there is a rapid increase, so that from 1½ ounce per hour at 8½ A. M., there will be 4 or 6 ounces per hour at 10½ A. M., and 6 to 8 ounces per hour at mid-day. From about this period there is a decrease, so that at 4 P. M. the quantity is reduced to 4 ounces per hour, at 7 or 8 P. M. to 2 or 3 ounces per hour, at 11 P. M. to less than 2 ounces, and from that point it falls to the lowest period of the twenty-four hours. It is, however, highly probable that if only a small quantity of fluid were taken at the usual breakfast hour, the excessive elimination of water before mid-day would not occur, and a more uniform distribution over the middle hours of the day would result. But when a large amount of fluid is taken at night, it commonly happens that no corresponding increase in the quantity of urine occurs on that day, but the fluid is retained, and is emitted on the following day."

The remaining pages of the first chapter of Dr. Smith's work are devoted to a detailed account of the results of an experimental inquiry into the influence of fasting upon the daily progression of the pulse, respiration, exhalation of carbonic acid and watery vapour from the lungs, and the elimination of urea and urinary water.

In the second chapter, which is well worthy of careful study, an admirable attempt is made to utilize these results of scientific research by pointing out their applications to practical medicine. Indeed, the work under consideration may be regarded in its entirety as a contribution to the science of *applied* physiology. In turning over its pages we feel at a loss which to commend the more, the purely scientific investigations therein recorded, or the manner in which the author, playing the part of the true physician, the healer and conservator of health, indicates how the results of these investigations may be most usefully employed as guides in the treatment and prevention of disease.

The practical truths inculcated in this chapter are laid down in a series of aphorisms, each of which is explained and commented upon at greater or less length. These aphorisms or rules applicable to health and disease are as follow:—

"1. In the morning hours, digestion and assimilation are performed in their most natural, and, therefore, most healthful manner, and that period especially demands an abundant supply of nutriment.

"2. No one in health complains of having taken too much breakfast.

"3. After the mid-day meal the amount of nutriment supplied should be more limited.

"4. With too much food supplied in the latter part of the day, there is a natural desire for artificial foods, or foods of a more highly seasoned kind, and for alcohols, and at that period such substances exert less influence upon the organism than they would exert in the morning.

"5. Early retiring to rest is indicated.

"6. Food should be taken in the night only under exceptional circumstances."

Dr. Smith's experiments show that the morning is the period of greatest vital action, and that as the day advances the food taken at the different meals does not cause an equal increase in the rate of the functions, the amount of urea being usually lessened hour by hour. Such facts seem to point out the necessity for a substantial breakfast, or one in which the amount of nutriment is of more importance than the quantity of food taken. The drinking of large quantities of tea and coffee at breakfast would appear, therefore, to be far less advantageous than the consumption of solid nutriment. These infusions contain but little nutritious matter, and as stimulators of the assimilative functions, they are less needed in the early part of the day, when these functions are naturally active. According to our author, milk, oatmeal and bread, and eggs, or other solid materials, should be freely used at breakfast. As tea is opposed to nutrition, it should not be used at this time, except when the natural powers of the system are insufficient to produce healthy assimilation. Food should be taken in the morning before any large amount of labour is performed, for with labour there is increased waste, and before breakfast there is no supply. An abundant and an early breakfast is especially essential to children, inasmuch as the increase in the vital actions in the early morning is greater in them than in adults. The rate of pulsation and respiration, and the evolution of carbonic acid being the greatest in one or two hours after breakfast, and again reduced at about four to five hours after that meal, to the lowest point to which it falls in the working day, an early and nutritious dinner

is required. This meal should be followed in the evening by a light supper. At this period of the day no substantial food should be taken, except under peculiar circumstances. For the observations of Dr. Smith show that after the middle hours of the day, the results of the chemico-vital action within the system are lessened, and that in the advanced evening they progressively and rapidly diminish, whatever may be the amount of nutriment supplied. Hence the activity of the assimilative function being lessened in the after part of the day, there is less necessity for the transformation of food, the introduction of which, at this time, to any extent, is more likely to be productive of injurious, rather than of beneficial results. According to our author, the object which should be had in view in the evening is rather the more complete transformation of the food which has been already taken than the supply of a further amount of food, and hence such respiratory and alimentary excitants as tea and coffee are clearly called for. In cases of great exhaustion, as in phthisis, in young infants, and in persons subjected to night-watching, with or without muscular exertion, food should be taken during the night.

The next series of aphorisms relates to variations in the quantity of blood and the heat of the body.

"7. The largest quantity of blood is found within two hours after each meal.

"8. The period of the day when there is the greatest amount of blood is usually in the afternoon, but it depends much upon the period of meals, and the amount and kind of fluid and food taken.

"9. The dangers resulting from excess of blood occur chiefly in the evening, and increase after each meal.

"10. The dangers from defect of blood occur mostly in the middle and advanced hours of the night, also in prolonged intervals between meals, and after unusual emissions of fluids.

"11. The dangers, whether from excess or defect of blood, are materially modified by change of posture of the body.

"12. It is believed to be well established that the normal temperature of the body is nearly uniform, and varies but two or three degrees under whatever normal conditions the body may be placed.

"13. This variation results from changes in the development and distribution of heat.

"14. The dangers from excess of heat are the greatest at and after the middle of the day.

"15. The dangers from defect of heat occur in the night and in the early morning.

"16. The arrangements in reference to the clothing of the body tend to lessen the variations of the heat of the body.

"17. Excessive clothing at night is highly injurious."

With regard to the capability for bodily and mental exertion, our author deems himself warranted by his observations to lay down as practical guides the following regulations :—

"18. The period most fitted for bodily labour is from the breakfast until the evening.

"19. The night is unfitted for physical labour.

"20. The periods most suited for mental labour are the morning and evening."

Next in order come certain generalizations relating to periods of the attacks of disease and the administration of remedies.

"21. In states of debility there is the greatest exhaustion in the evening and in the early morning.

"22. In conditions of mal-assimilation of food it is important to apply all suitable remedies during the middle periods of the day.

"23. Fevers and similar diseases, having an increase in the evening, require a modification of the natural arrangement.

"24. In acute inflammation the remedies should be chiefly employed in the middle parts of the day.

"25. Apoplexy chiefly occurs after a meal, or in the later hours of the day.

"26. Hemorrhage is much more liable to occur in the day than in the night.

"27. The remedies for the states of exhaustion, as the delirium of inanition or delirium tremens, should be applied chiefly in the evening and during the night.

"28. Nervous affections are commonly the most marked in the evening and during the night.

"29. The period for the administration of medicines should vary with the known mode of action of each medicine, and the hourly variations in the vital processes of the system.

"30. Purgatives should be always administered at night, for then there is the greatest accumulation of blood, and of carbonaceous or other effete alvine matter.

"31. Diuretics should be administered with considerable frequency in the afternoon and evening, and not in the morning.

"32. Sudorifics are called for in the daytime, and directly after each meal, so long as any excess of food shall be found in the system. They are less indicated in the night, and in the early morning they would be injurious.

"33. Stimulants, when required at all, are especially needful in the early morning and in the evening, whilst during the day they may be much less advantageous.

"34. Sedatives, when intended to influence the whole economy, are suited to control excess of action during the day, and may then be more freely administered than during the natural period of decline of the vital powers in the advanced evening.

"35. Narcotics, having a mixed action, are rather suited to the class of cases where there is unusual depression of the vital powers, and then may be used temporarily at any time, but for a continued action they are more suitably administered in the late evening, since they primarily excite, and by repetition may be restricted to that action.

"36. Cholagogues are more called for in the afternoon and night when the transformation of food is more urgently required."

We regret that our limits will not permit us to dwell at any length upon the facts adduced and the reasoning adopted by our author in support of the foregoing propositions. We recommend their perusal to our readers with the assurance of deriving profit therefrom.

Chapter 3d treats of the weekly cycle performed by the vital operations.

Having established the occurrence of a daily cycle of vital changes, each returning with regularity as the phenomena of the day appear, and each bearing a close resemblance to those which have come before, Dr. Smith next attempts, but with less success, we think, to demonstrate the weekly fluctuations in the rate of pulsation and respiration, in the evolution of carbonic acid and urea, and in the weight of the body. A weekly cycle of vital changes is not so evident, inasmuch as the causes of recurrence are not universal, and do not so readily attract attention. With most persons this weekly cycle appears to be influenced, if, indeed, it is not produced, by the institution of the Sabbath—the long-ordained day of rest to the mental and physical organization. In the course of his inquiries at the Hospital of Consumption, Dr. Smith found that the rate of pulsation increased through the week and decreased on each Monday, whilst that of respiration decreased through the week and rose on Monday. An increase in the quantity of carbonic acid evolved was commonly observed on Monday morning. This increase probably resulted from an unusual accumulation of

nutritive matter, caused by rest, and a little increase in the quantity of food taken on Sunday. There was commonly an increased elimination of urea on Sunday, including the day and the following night. In the whole average of the year, to the end of February, 1861, the amount of urea evolved daily was seventeen grains more on Sunday than on week-days, the actual quantities being 523 grains daily on the whole average, and 540 grains daily on the average of the Sundays. The weight of the body is highest on Sunday; as the week advances it is lessened, until on Saturday it reaches its lowest point. From these statements our author infers that a periodical day of rest is necessary to the well-being of the body if a suitable amount of exertion be made daily; and that clergymen and others whose duty calls them to labour on Sunday should set apart another day as a day of rest.

From the early part of 1858 to the beginning of 1861 Dr. Smith was engaged, as he informs us, in studying the influence of seasonal changes upon the evolution of carbonic acid, the quantity of air inspired, the depth of inspiration, the rate of pulsation and respiration, and the elimination of urea, water, and other excretions. These scientific researches and the practical applications deducible from them are embodied in chapters 4, 5, and 6 of the work under consideration. They may be thus summed up:—

In the early part of June the amount of carbonic acid evolved began to diminish, and continued from that to decrease progressively through June, July, and August, until the commencement of September, when the lowest point was attained. From this time an upward tendency was manifested, and it continued through October, November, and December, until January, when a point was reached from which there was little variation through January, February, and March. In April and May the amount was yet further increased until the starting-point was again reached. The extreme amount of change observed was a loss of 3 grains of carbonic acid per minute (or one-third of the maximum quantity) from the beginning of June to that of September; a gain of 2 grains and upwards from September to January; and a further gain of half a grain to the maximum period of the year. The average amount of carbonic acid for the whole year, given out at rest and before breakfast, was a little over 8 grains per minute.

"From the whole of the foregoing statement we learn that in the summer season the amount of chemico-vital change progressively lessens, until the period arrives when there has been the greatest accumulation of heat upon the surface of the earth; in the autumn there is a progressive increase, by which two-thirds is gained of that which had been lost in the summer months; in the winter the amount is tolerably stationary, and varies scarcely more than half a grain per minute, whilst in the spring there is the highest amount of vital action observed during the whole cycle of the year."

The average amount of air inspired was 425 cubic inches per minute, the extremes being 588 cubic inches, observed on April 12th, and 363 cubic inches on July 13th. From April to October the quantity decreased: after October it increased. The monthly average rate of respiration was 14.3 per minute in April; from this point it declined to 10.9 per minute in August, September, October, and November; thenceforward the rate increased again, but fell short of the number recorded in the previous April. The rate of pulsation continued high during the summer months, and attained its average maximum of 73.3 per minute in August.

The daily quantity of urea eliminated in 1860 was found by Dr. Smith to increase steadily from March to September, except in the month of July, when it fell somewhat. During October, November, and December, the

quantity was diminished. In January, February, and March, 1861, it again increased. From May to October the average daily amount discharged was 570 grains; from November to April, 480 grains. It thus appears that under ordinary conditions there is a progressive increase in the excretion of urea as the spring advances, and throughout the summer, until the autumnal months, when the amount corresponds very much with that evolved during the winter. The quantity of urinary water discharged per day during 1860, increased from March to September, when the maximum was attained, and an average increase of 13½ ounces per day was recorded. From this time there was a progressive decrease, with a minimum in the month of January, when the decrease from the maximum was 17 ounces per day.

In concluding the account of this series of his researches our author presents us with the following

"*Summary of Seasonal Influences.*

"*Summer.*—The summer season exerts the most marked power, and under its influence the body exhibits the following minimum and maximum conditions:—

"There is the *minimum* of carbonic acid and vapour exhaled, of air inspired, of the rate and force of respiration, of alimentation and assimilation, of animal heat generated, of muscular tone and endurance of fatigue, and, in general, of resistance to adverse influence.

"There is the *maximum* of the rate of pulsation, of the action of the skin, and the elimination of vapour; of the dispersion of heat, of the supply of heat from without, and of excess of heat; of the elimination of urea and urinary water; of the distribution of blood to the surface, of the imbibition of fluids, of relaxation of the tissues, and of poverty and carbonization of the blood.

"*Winter.*—In the winter season the above conditions are, for the most part, reversed.

"*Autumn.*—Autumn is marked by the summer or the winter condition, as the character of the season resembles the one or the other; but it is essentially a period of change from the minimum towards the maximum of vital conditions.

"*Spring.*—In the early and middle parts of the spring season every function of the body is in its highest degree of efficiency, but as it advances these maximum conditions merge into those of summer."

Advancing still further into the work under notice, we find that the next eighty pages, constituting chapter 6th, are devoted to a deeply interesting discussion as to the influence of season upon muscular power, sensibility, viability, growth, food, disease, and medical treatment. Our author herein displays the true Hippocratic spirit of observation. He advances, as the matured results of his inquiries, and as he has already done in one of the previous chapters noticed above, a series of physiological and hygienic aphorisms, in support of the truthfulness and reliability of which he brings forward reasons of a more or less cogent nature. Many of these aphorisms may be accepted by the practitioner as well-established and truthful guides. The correctness of some of them, however, we are constrained to think is still open to discussion. Be this as it may, we deem them all of sufficient importance to be reproduced here, especially as their recital is necessary to complete the analysis which we desire to present to our readers.

"1. The muscular force and power of endurance of the body varies with the season, and the least is found at the end of summer or the beginning of autumn.

"2. The causes of the diminution in power and endurance are four, viz.: The rapidity of the circulation, the difficulty of maintaining a fixed temperature, lessened chemical action, and relaxation of tissue.

"3. Spring is the season of greatest muscular power and endurance, and then the winter.

"4. The sensibility of the system to temperature and tactile impressions is greatest in the spring and summer.

"5. The viability of those children is the greatest who are born in the winter and spring months, and the most suitable periods for marriage are the spring and summer months.

"6. The periods of maximum and minimum growth are spring and summer, on the one hand, and autumn and winter on the other.

"7. There is less variation in the amount and kind of food taken by mankind than has been asserted.

"8. The dangers from excess of refuse food are greater in the summer than in the winter.

"9. Free dejection from the bowels is more necessary in summer than in winter.

"10. Free emission of urea is the most necessary in spring and summer.

"11. Spring is the season the most fraught with danger from excess of transformation of food.

"12. It is probable that nitrogenous foods are more necessary in the hot season than we at present admit.

"13. The use of diluents is nearly equally necessary at all seasons of the year, but for very different purposes. In winter diluents are especially needed to enable the urea to be freely evolved. In the summer season they are chiefly required to supply a sufficient amount of fluid for the purposes of the perspiration.

"14. The amount of blood is probably the greatest in the spring, and the least at the end of summer.

"15. The Turkish bath may be beneficial in spring and summer, and at the change of the seasons, but can only be useful in conditions of the system in which there has been an undue retention of fluids, or in which the skin is deficient in activity.

"16. The foundation of seasonal disease is the varying degree of vital action proceeding within the body at the different seasons of the year.

"17. There are diseases which result from an arrest or lessening of the natural tendencies of the system.

"18. The constitutional peculiarities of individuals modify the effects of season.

"19. The dangers to be apprehended in the progress of disease vary with the season. The dangers will increase as the season progresses, and will be greatest at the commencement of the period of change.

"20. The frequency of certain diseases has a relation to the season, and to the nature of the disease.

"21. Diseases of the alimentary canal have their maximum intensity and frequency at the period of minimum vitality.

"22. The greatest mortality from the plague in England occurred at the minimum period of vitality.

"23. The greatest mortality in chest diseases is found in the periods of increasing and maximum vital action, and the least mortality at those of minimum vital action.

"24. Brain diseases prevail in the cold season.

"25. Eruptive diseases for the most part prevail at the seasons of change.

"26. The type of a disease has also reference to the conditions of the system which preceded its occurrence.

"27. The rotation of the seasons is a chief element in the vis medicatrix naturæ.

"28. The change of seasons is the safeguard of the human race.

"29. The daily habits of mankind are based upon the beneficial effects of change of season.

"30. The beneficial action of the rotation of the seasons is the true foundation of expectant methods of medical treatment, and therefore of homœopathy.

"31. The kind of cases which are said to be especially fitted for homœopathy are those in which seasonal changes will necessarily lead to improvement of health.

"32. The period when there is the most evident effect from the expectant treatment is at the change of seasons.

"33. The result of treatment in acute diseases varies with the period of the year.

"34. The effect of remedies varies with the different periods of the year.

"35. The action of a remedy will appear to be very different as it acts with or against the natural tendency of the system at the period of its administration."

Chapters 7, 8, and 9 treat at considerable length of the cyclical changes in the infantile, adult, and senile ages of man, and the practical applications of a thorough acquaintance with these changes.

Finally, the cycle of the generations of man is ably discussed in chapters 10, 11, and 12, wherein the reader will find many interesting statements concerning the occurrence and the causes of epidemics and the changes in the social habits and in the type of disease in the nineteenth century.

We have thus presented our readers with a general analytical *résumé* of this most interesting work. At once philosophical in conception and practical in application, the physiologist and the physician will alike find in it many valuable additions to the record of their favourite science, some of which seem to be well established, while others, though highly plausible, need yet a more elaborate investigation before they can be received into the category of undoubted facts.

The work of Dr. Mussey has been undertaken and executed with a different object. It addresses itself to the popular rather than the scientific reader. It has been the author's aim "to meet the comprehension of the general reader, and, at the same time, to present some suggestions which, it is hoped, the young physician may find not wholly beneath his regard."

The work is divided into twenty-five chapters. The first treats of the corset, clothing, boots and shoes, &c., and is illustrated with a series of wood-engravings representing the various quaint styles of dress of former epochs. The second discusses ventilation, light, sleep, exercise, and bathing. Chapters three, four, and five are devoted to the consideration of the uses and effects of alcohol, tobacco, tea, and coffee. Chapter six contains a brief account of the case of the celebrated Casper Hauser. The "organic sympathies" constitute the subject-matter of the next chapter. Throughout the remainder of the work the author eulogizes vegetarianism, labours to show that man is, by nature, a vegetable feeder, and points out, at some length, the ill effects of the omnivorous practices of the human family, and the beneficial results of a vegetable diet in the treatment of various medical and surgical maladies. Finally, an attempt is made to show, in the last chapter, that a purely vegetable regimen favours great length of life.

Many cases of extraordinary longevity are cited in proof of this proposition. There were in the United States, in 1850, two thousand five hundred and fifty-five persons of over one hundred years. This shows, Dr. Mussey thinks, that about one person in nine thousand will be likely to live to that age.

"We have not the means," he writes, "of determining to what extent human life might be carried under the most favourable circumstances. After making due allowance for inaccuracy of record, there is reason for believing that in modern times some few individuals may have attained the age of nearly if not quite two hundred years. It will be recollected that several hundred years were occupied in abridging life—from the time of the flood to the time of Moses, who mentions seventy years as the ordinary period; and if, during this long term, the mischievous influences were gradually deepening their hold on life, until its

minimum, in a particular climate and community, had been arrived at, might not, on the other hand, most valuable results be looked for under the operation of hygienic agencies which are within the reach of human ingenuity and effort, protracted through a series of generations? Among these agencies, are, an atmosphere of the highest attainable approach to purity in dwelling-houses and public institutions; the life-quickening power of direct sunshine; much exercise abroad in the open air; clothing adapted to the changes of weather; food nutritious, at the same time bland and unirritating; a drink made in Paradise, made right at first, neither requiring nor admitting of narcotic or alcoholic admixtures, and a medication to extinguish disease, or abate its force, or prevent its attack. We already possess vaccination, which can rid the world of one of the most terrific and destructive epidemics which have invaded the human family; we have the Peruvian bark and its extracts, which operate not only to extinguish marsh and lake fevers, but, when taken at suitable intervals in a malarious atmosphere, neutralize the poison, and are a complete prophylactic or preventive of an attack of the fever; we have mercury and iodide of potassium to meet the poison and allay the tortures of constitutional syphilis; colchicum for the merciless attacks of gout and rheumatism; and carbonate of iron and arsenic and strychnia for some refractory forms of neuralgia. We have already remedies for many parasitic animals and plants that nestle in our internal organs, or burrow or take root in the skin; and as the researches of pathologists are now pushed with enthusiasm in this department, we may anticipate for man a nearer approach to immunity from their attacks upon comfort and life than can ever be realized by the larger animals of the lower tribes which have no means of destroying these invaders, while in self-made diseases, we outnumber them a hundred to one.

"The remedial means we already possess of abating the force of sweeping diseases, or of extinguishing them altogether, reasonably inspire the hope that choleras, yellow fever, scarlatina, typhoid and typhus, and tubercle, if not starved out by hygienic influences, will have their remedies or antidotes, and will be met with the same confidence as we now meet smallpox or lake fever. And if the time shall ever come—and who does not look for a *moral* and *physical* regeneration of our race, for surely one cannot come without the other—when the food best suited to a prolonged and uniform health shall be adopted—the appetite not left to become gluttonous like that of the beasts, but kept under the conscientious control of reason and science—and the only drink that of Paradise, then there will be a progressive improvement in health, and life will be lengthened as certainly as it has been shortened by the sottish inventions of man, the human face no longer blotched and scarred from an empoisoned blood, but fresh and fair, and lit up by an eye sparkling in its hundredth year. On this subject we are not left without a cheering note from the harp of prophecy: 'There shall be no more thence an infant of days, nor an old man that hath not filled his days; for the child shall die an hundred years old; . . . . and they shall build houses and inhabit them; and they shall plant vineyards, and eat the fruit of them. They shall not build, and another inhabit; they shall not plant, and another eat; for as the days of a tree are the days of my people, and mine elect shall long enjoy the work of their hands.'"

Although compelled, in view of the present teachings of physiological science, to dissent from many of the leading views of Dr. Mussey, we do not hesitate to refer the non-professional reader to his work as one in which will be found an extensive and valuable fund of hygienic information.

J. A. M.

BIBLIOGRAPHICAL NOTICES.

ART. IX.—*Transactions of State Medical Societies:—*

1. *Transactions of the Medical Society of the State of New York, for the year* 1862. 8vo. pp. 532.
2. *Communications of the Rhode Island Medical Society, for the year* 1862. 8vo. pp. 195.
3. *Transactions of the Medical Society of New Jersey,* 1862. *Ninety-Sixth Annual Session.* 8vo. pp. 116.
4. *Transactions of the Medical Society of the State of Pennsylvania, at its Thirteenth Annual Session,* held in Philadelphia, June, 1862. 8vo. pp. 152.

1. THE theme of the annual address before the Session of the Medical Society of the State of New York, for the year 1862, by the President of the Society, was "the essential dignity of the profession of medicine," and ably has it been handled by him. No one can rise from the perusal of the address without the full conviction that the calling of the physician is one which is worthy of man. To enable him to learn how best to relieve the suffering, and to heal the sick, demands of him his highest and most earnest efforts; and that his mind and body be always kept in readiness to decide upon and to act in the most critical cases, where life hangs upon a thread. The fulfilment of all its requirements confers upon the members of the medical profession a dignity than which none can be truer or greater. Though upon his breast he wears no jewel conferred by any earthly power to mark approval of his efforts in behalf of suffering humanity, the true physician bears constantly within his heart the consciousness of approval on the part of a power mightier than all worldly kings, and potentates and powers.

The address is followed by a very full and searching review of the medico-legal evidence in a case of imputed murder, tried at the Oneida, N. Y., Circuit Court, in August and September, 1861, and in which it was decided by the court and juries before which the case was heard, that no murder had been committed, but that the death was one of suicide. The case is one of much importance in all its medico-legal bearings. Dr. Swinburne, of Albany, by whom the review was drawn up and presented, has, we think, very clearly shown that the death in this case could not possibly have been the result of a suicidal act, but was produced by suffocation or strangulation on the part of the husband, the throat having been cut after death, and a razor placed near the body, with the view of leading those who first discovered it to the conclusion that a suicide had been committed. To understand the case fully, and the true bearing of the arguments of Dr. Swinburne, the review before us must be read *in extenso.*

The *third* article comprises contributions to medico-legal science, by Dr. CHAS. H. PORTER, of Albany.

The first contribution is on *the Detection of Arsenic,* and the second is the history of *a series of cases of Arsenical Poisoning.*

Prefatory to his report of a series of cases of poisoning by arsenic, Dr. P. considered it advisable to present an account of the several methods pursued for the detection of the poison. The writer lays no claim to originality for this preliminary matter—it being simply a compilation from various sources. His design is to point out a general mode of procedure in all cases of metallic poisoning—insuring the detection of the various toxical agents—with special reference, however, to arsenic, and again to give a systematic plan, whereby the material can be most properly prepared for obtaining the various tests, together with a brief description of the more characteristic chemical reagents for arsenic.

The paper is a well drawn up one. It is especially instructive in respect to

the modes of procedure applicable to those cases where the particular poison is unknown.

A careful study of the cases of arsenical poisoning, given by Dr. P., is recommended to all who are so circumstanced as to render them liable to be called upon to undertake a lego-medical investigation in cases in which a suspicion of poisoning has been excited.

The *fourth* article is by STEPHEN ROGERS, M. D., of New York City, and is entitled *The Preventive or Prophylactic and Curative Uses of Quinine, in Miasmatic Localities, and in Miasmatic Diseases.* In whatever manner quinine, when properly given, protects the system from the morbific influence of the air of certain climates and localities—whether by fortifying the body in such a manner as to prevent the action upon it of the miasmatic poison, or by so neutralizing the specific action of such poison, as to prevent the production by it of either of the forms of miasmatic fever—the fact of its preventive power is now well established. By recent observations made by different individuals and under circumstances well adapted to insure accuracy of results, the question has been put beyond the possibility of doubt. The general deductions in respect to this question arrived at by Dr. Rogers, are as follows:—

"First. When men are to be sent into miasmatic localities, either from ships or from land forces, a dose of quinine, sufficiently large to produce some appreciable evidence of its action, should be taken by every one before entering such locality, and should be repeated once in twelve, and in some cases once in eight hours during the time spent there.

"Second. Removal from a miasmatic atmosphere for any twelve hours, and especially during a night, is quite equivalent, as a protective, to one dose of quinine, it may be much more economical, and, when practicable, is by far the most desirable protective measure.

"Third. In all cases where this measure can be daily practised, it will unquestionably preserve the susceptibilities of the brain to the action of the medicine, for an indefinite and probably long period, and will thus serve indirectly as a most efficient protective.

"Fourth. Officers and chiefs in command, should by all means avail themselves of the advantages to be derived from such intermissions in exposure, and thereby maintain their susceptibility to the quinine more or less unimpaired. By so doing, the loss of their important services would be rendered much less liable, and the consequent embarrassment to operations would almost surely be avoided.

"Fifth. When continuous exposure is inevitable, there is no safety in attempting to protect from infection, by the use of quinine, for a longer time than two months, and as a general rule, it is not advisable for longer than one month.

"Sixth. Ceasing its administration at this period, by the time the infection takes place, and the premonitions appear, the susceptibilities to the medicine will have become so restored that it will be practicable, generally, to prevent the paroxysms for long periods of time.

"Seventh. As quinine is a stimulant, with specific action in all conditions of depression or exhaustion from miasmatic poison and miasmatic disease, it is indicated in all cases, irrespective of the state of the skin, when the unaided powers of life are likely to be unable to restore to healthy action within the time required to avoid a renewed attack, and also when there may be danger that the vital forces will be overwhelmed by the poison in the onset of the disease; and that when so indicated, it should be promptly and efficiently employed, either by the stomach or rectum, as the case may demand.

"Eighth. By an observance of these rules, and by avoiding the causes of other diseases, most men, of even ordinary constitutions, can be kept in miasmatic localities for years, in an efficient state of health."

The next article (*fifth*) is on *Paralysis a Sequela of Diphtheria—Reflex Paralysis*, by D. D. BISSELL, M. D., of Utica. Seven cases of palsy after attacks of diphtheria were observed by Dr. B., between the 1st of July and the middle of September, 1861. Of these, five terminated fatally, one recovered; the remaining case still continued, though somewhat improved, after a lapse of six months. Of the fatal cases, *two*, a boy and girl, about three years old, were

attacked within eighteen days after recovering from diphtheria; *two*, a girl of about three years, and a boy of ten, were attacked within twenty-five days, and *one*, a boy, between six and seven years old, was attacked in thirty days.

None of these patients lived longer than fifteen days after the first symptoms of impaired innervation became manifest, and three of them died within from six to ten days. The one case in which recovery ensued was in a boy three and a half years old. The attack occurred during convalescence. In this case nearly all the motor muscles, including those of speech and deglutition, were paralyzed. This state of things continued about thirty days, when the patient began to articulate, and the muscles of the neck and trunk to regain their power, and soon after those of the limbs also. During this time, a period of nearly six weeks, the patient slept well, had a good appetite, a clean tongue, regular bowels, and a normal condition of all the secretions and excretions. The pulse was always small, soft, and very rapid, and the surface cooler and paler than natural. The recovery in this case was rapid and complete; and, at the end of six months and more the patient was in good health, with the free use of all his muscles.

The boy, in whom there was, after six months, persistent paralysis, was about four years old, healthy and strong for his age, when he was attacked with diphtheria—which was mild and of short duration; his recovery seemed perfect. Symptoms of paralysis set in at the end of three or four weeks; and in a week subsequently he had lost all power of locomotion, and in a great degree the use of his hands and arms. There was no difficulty of deglutition, and the voice and tongue were not affected.

All these patients, with a single exception, had nearly or quite recovered their usual health, when attacked with paralysis. The earliest symptoms were an unsteadiness or staggering and dragging of the limbs when attempting to walk, with formication and tenderness in the muscles of the thigh, leg, etc. There was a greater loss of power and co-ordination than of sensibility in the parts affected. Usually, the muscles of the neck, arms, and hands become enfeebled, and soon after, in some cases, those of the pharynx and tongue become more or less involved in the disease. In two instances portions of fluids which were attempted to be taken, were returned through the nose, while solid substances were more readily swallowed. Vomiting, towards the close of the disease, occurred in a few cases. The pulse was in all cases soft, feeble, and easily counted, in most it was infrequent—sometimes not more than thirty beats in a minute. In two or three instances it was very quick and feeble, scarcely to be counted. The surface of the body was paler and cooler than natural, the muscles everywhere having a doughy, inelastic feel, but without any considerable atrophy. The appetite remains good, digestion is perfect, the bowels regular, the alvine discharges normal, and the urine natural in quantity and healthy in appearance.

There were no indications of uræmic poisoning. There was no pain of the head or tenderness of spine; no apparent lesion of the cerebro-spinal organs. No coma. The mind was always clear and usually cheerful; the sleep quiet and natural. The respiration corresponded with the pulse, being slow when this was slow, rapid when it was rapid. The lungs and heart presented no indication of organic lesion.

Death usually occurred suddenly; when the patient was sitting up talking with those around him, or amusing himself with his toys, life would become in an instant extinct, without a groan or the distortion of a muscle—probably in consequence of paralysis of the heart.

Our knowledge of the pathology of the paralysis which succeeds to an attack of diphtheria is very limited. Dr. Bissell conceives it more than probable that impaired nutrition in the periphery of the sentient nerves, either from impure blood or a diminished supply of arterial blood, is the exciting cause—the outward excitation of Brown-Sequard. The morbid impression cast upon the cerebro-spinal axis, though a reflex action, manifests itself in a partial or general paralysis according to the locality from which such reflex action proceeds. The higher the point of reflexion, the more general the consequent paralysis.

The following are the conclusions of Dr. Bissell, in respect to the proper

treatment of the paralysis under consideration, drawn from the cases which have fallen under his notice:—

"1st. Rest, as perfect as is practicable, on the back, with the head, arms, and legs well elevated, to favour the descent or 'gravitation of blood to the spinal cord;' friction to the spine and limbs, when it can be applied without causing exhaustion or fatigue; the external application of a warm solution of sulphuret of potash to the surface, to increase the action of the dermoid tissues and capillary vessels, and wrapping the body in warm flannels, not only become valuable auxiliaries to, but constitute an important part of our plan of cure.

"2d. Strychnine given repeatedly, in small doses, so as to avoid constitutional effects—the 40th or 30th of a grain, five or six times a day—is the remedy most entitled to confidence.

"3d. The pyrophosphate of iron ranks next to strychnine in our available means of cure. It may be given either in solution, or in a pill, in doses of from three to five grains, three or four times a day.

"It is of the highest importance in the cases of reflex paralysis, such as described, that the treatment should be commenced during the first stage of the disease, and as soon as the loss of power in any of the muscles begins to manifest itself."

Next follows a case of *Healed Ulcer of the Stomach*, discovered after death, from ulceration of the duodenum, by J. KNEELAND, M. D., of Onondaga Co., N. Y. The most important feature in this case is the fact established by it, that organic disease of the stomach of frightful extent and productive of great suffering and disturbance of function for months and even years, is capable of being relieved or even cured.

J. R. BOULWARE, M. D., of Albany, relates a case of *Wounded Trachea*—with obstinate vomiting, congested lungs, suffocation. The subject of it was an apparently healthy female, 23 years of age, who attempted suicide by cutting her throat with a razor. The crico-thyroidean membrane was wounded, and the cricoid cartilage and upper ring of the trachea, together with several small bloodvessels, were divided. The edges of the wound were drawn together and retained by adhesive plaster. At the end of three weeks, with the exception of a small opening in the trachea just below the cricoid cartilage, the wound had healed. The edges of the opening were touched with caustic and drawn together by adhesive strips. A collection of mucus took place in such quantity as to threaten suffocation. To get rid of this the wound was reopened and a tube inserted. After a few days the tube was withdrawn and the opening dressed with adhesive plaster. It soon began to contract and respiration to be slightly impeded. The contraction of the wound went on diminishing the calibre of the trachea, and causing such urgent dyspnœa as to require the opening to be enlarged and a tube inserted. After several weeks the tube was withdrawn and the wound again dressed with adhesive plaster. At the end of eleven weeks from the time it was inflicted the wound was entirely healed, and remained closed for five days, when the dyspnœa became again so intense that it was necessary to reopen the trachea; instant relief was the consequence. The opening was just below the cricoid cartilage; a large tube was worn in it constantly. The patient now began to lose her voice; in a few weeks it entirely disappeared.

When the opening in the trachea was closed by the finger suffocation would immediately ensue. The patient, nevertheless, could speak in an audible whisper. Her articulation constantly improved up to the period of her death. By placing the ear close to her mouth she was able to convey readily her ideas in an audible whisper. To within a few days of her death she enjoyed excellent health. Considerable difficulty being experienced in expectorating mucus through the tube, this was withdrawn, and with the forceps several portions of tough mucus were removed from the trachea, affording instant relief. Similar attacks followed, each becoming more intense. They were preceded and accompanied by violent and distressing vomitings.

All the symptoms increased constantly in urgency, the dyspnœa became more intense, the countenance livid and anxious. She finally died with all the symptoms of suffocation, nineteen months after the receipt of the wound.

On examination after death, both lungs were found congested; their tissue was healthy, with the exception of a small portion near the apex of the left lung, which was of a reddish-brown colour and softened, readily sinking in water, presenting the appearance of pneumonia in the second stage: the bronchi and lower portion of the trachea were almost completely obstructed by masses of viscid mucus, with which blood was so intimately incorporated as to give to it a pale dingy red colour throughout. Many of the smaller bronchial tubes were also completely obstructed by the same kind of mucus. The canal of the larynx was found to be completely obstructed at the upper portion of the cricoid cartilage by a dense white fibrous tissue: on examination the latter was found to be perfectly organized and firmly attached to the inner surface of the cartilage, extending to its lower border and filling up that portion of the larynx included within the lower third of the cricoid cartilage, entirely impeding the passage of the air. The portion of the trachea immediately below the larynx was contracted to one-third of its normal size. The remaining organs of the body presented no lesions of any account.

The next article (*eighth*) is entitled *Medical Provision for Railroads as a humanitarian measure, as well as a source of economy to the Companies.* Dr. E. Arnold, of Yonkers, Westchester Co., N. Y., has treated the subject set forth in the title of his communication with great ability. Facts which indicate the probable risk of accident involving more or less serious injury to the passengers and employees, on a railroad, and the necessity, in the majority of these cases, of prompt surgical assistance for the relief of suffering and the preservation in many instances of limb or even of life, show the propriety of medical provision for railroads as a mere question of humanity. This position is strongly enforced by Dr. Arnold. While he has shown also, with equal clearness, that as a simple matter of economy, railroads are bound to make such provision in justice to the stockholders, whose funds are almost annually depleted by heavy damages recovered as a compensation for injuries sustained by passengers—which injuries, and the amount of pecuniary compensation in consequence awarded, would very often be materially lessened were surgical assistance always provided at the moment when it is most demanded, and when it would also be most efficient.

Dr. H. S. Downs, of New York city, relates a *Case of Peritonitis occurring in a female child ten years old*, in which enormous doses of opium were administered. The cure was effected at the end of about thirty days.

According to the statement of Dr. D. the patient took during eleven days of the period of greatest suffering, 148 grs. of morphia, one bottle of McMunn's elixir of opium, and half an ounce of Magendie's solution of morphia, besides having 20 grs. of morphia sprinkled upon the blistered surface of the abdomen, and a quantity of laudanum and opium given in the form of enemas and suppositories. She also inhaled a considerable amount of chloroform. The largest quantity of morphia taken on any given day, was twenty-eight grains. On another day she took a bottle of McMunn's elixir of opium and twenty-four grs. of morphia. During her sickness her mind was upon the whole clear and rational; nevertheless, since her recovery she does not appear to remember anything which occurred previously to the 23d day of her sickness, not even a large blister over her abdomen, which remained perfectly raw for more than a week.

A case of *Cirrhosis of the Liver, Enlarged Spleen, and Abnormal Distribution of the Vessels between it and the Stomach*, by Dr. M. M. Marsh, of Onondaga County, N. Y., constitutes the *tenth* article. The most interesting abnormal appearances detected after death in this case were those of the liver and spleen. The liver was bilobed and completely cirrhosed throughout, with almost entire arrest of circulation through it. The gall-bladder, nevertheless, was filled with apparently healthy bile. The liver was of less than the normal size; it weighed three pounds seven ounces. The splenic artery was so dilated as to easily admit the thumb one-fourth the length from its distribution; a branch passes from it to an exactly duplicate spleen, about the size of the healthy organ, and suspended from the upper large spleen by a membrane as the liver is from the diaphragm. The weight of the superior spleen was fifty-eight ounces, healthy in appearance, and, in place of the usual distribution,

sending two parallel vessels to the stomach, each equal in diameter with the enlarged splenic artery, and apparently penetrating the coats of the stomach. The vessels were so much softened as to prevent their dissection. The stomach, otherwise apparently healthy, opposite the place of connection of these vessels had its mucous coat and a portion of its muscular ruptured. On being washed, torn muscular fibres were detected for more than one inch in extent around this part. The peritoneal coat was entire.

The points of interest in this case, according to Dr. Marsh, are, that there was, during the life of the patient, no evidence of diseased structure or function of the liver; the existence of a softening of the aorta without observable fatty degeneration; the unique occurrence of an absolutely duplicate spleen attached by membrane to the parent body; and, the extremely rare circumstance of two immense vessels supplying the place of the vasa brevia.

The *eleventh* article is *A Protracted Case of Lameness*, by Dr. HIRAM CORLISS, of Washington County, N. Y. The subject of this case strained his ankle when eighteen years of age. After a few weeks he recovered, and remained well until he was twenty-one years old, when he again strained his ankle. This was in the summer of 1851, the patient being then a student in an eastern college. The sprain continued to be troublesome until the spring of 1852. In the May of the latter year the patient whilst walking experienced a slight pain beneath the left patella. The next morning the knee was much swollen above and below the joint, and inflamed. The lameness continued about the same in extent for more than a year.

The treatment consisted chiefly in the application of iodine, blisters, bandages, and the affusion of cold water. During the spring and summer of 1853 he was free from disease. In the fall the patient had a severe attack of typhoid fever. On recovering, he commenced the life of a student in New York, and was compelled to climb daily several flights of stairs. At the end of about two months, the disease of the left knee returned, attended with a dull heavy pain at the lower part of the spine. Relinquished his studies and tried a variety of remedies. Took a sea-fishing trip for a month. Pain ceased in the back; lameness not materially improved. Commenced teaching in the fall of 1854. Lameness continued until the summer of 1855, when it again ceased, and the knee gradually recovered its strength. In the winter of 1856, the patient teaching in a large boarding school, pain and swelling of the right knee took place. It recovered its healthy condition in the ensuing summer. There was no renewal of the attack during the next two years, though the patient was engaged in teaching a day school. In the spring of 1859, six weeks after the patient had again commenced teaching in a large boarding school, the swelling and lameness of the left knee reappeared, and two weeks subsequently of the right knee also. The pain in the lower part of back returned likewise. In the spring of 1860, the right knee became well, and in the summer the left knee began to improve and continued to improve up to February, 1862. In the fall of 1860 the right knee was again attacked, and continued affected up to the early part of the present year, occasionally improving and relapsing. Both knees are somewhat altered in form by deposition around the joints. There is not, nor has there been any pain excepting when the affected limbs are used.

Temperament of patient, nervo-sanguine. Habits, strictly temperate; indulges in no debilitating vice. General health always good. Sleeps well; has a good digestion; never has the blues.

Blistering and rest have generally appeared to act favourably in respect to the left knee, but unfavourably as regards the right one. Application of muriate of ammonia reduces for a time the swelling, but exerts no permanent effect. No benefit, but, occasionally, injury was experienced from the use of iodine, cups, leeches, poultices, liniments, setons, etc.

Art. 12. This is the history, by Dr. T. C. FINNELL, of New York city, of the case of a female child, nine years old, in which an attack of *dysentery was followed by acute peritonitis*, when a spontaneous opening at the umbilicus occurred, through which a large quantity of pus was discharged, when entire recovery ensued.

The attack of dysentery had lasted four days previously to the child being

seen by Dr. F. Small doses of morphine every two hours were directed. At the end of ten days the symptoms of dysentery had entirely disappeared. There was a desire for food, and the child sat up in bed, and was rapidly recovering.

Five days subsequently, symptoms of acute peritonitis set in, with tenderness over the abdomen, tympanitis, high fever, intense thirst, etc. At the end of four days, the presence of a fluid within the peritoneal sac was evident. Five days later, the fluid had increased in quantity; tongue clean; pulse 100; bowels regular; some difficulty in breathing from distension of abdomen. This condition of things continued with little change for upwards of three weeks, when the umbilicus, which had gradually become red and tumid, gave way, and four pounds of pus, yellow in colour, of the consistence of cream, and free from odour, were discharged. No collapse or other unpleasant symptom followed. The child experienced great relief after the opening occurred. The discharge diminished day by day. At the end of two months the opening at the umbilicus was closed, and in a few weeks later the health of the child was completely restored.

Art. 13. *Malignant Pustule in the United States.* By Dr. A. N. Bell, of Brooklyn.—In presenting a sketch of the several occurrences on record of the disease in this country, Dr. Bell gives a very faithful description of it, together with a brief notice of the leading facts illustrative of its etiology.

According to Bourgeois, the latest authority (Paris, 1861), in the human subject malignant pustule occurs most commonly on the face, and next on the hands, neck, and arms—very rarely on the trunk. There first occurs a painful swelling, upon the central portion of which, within most generally three days, a small reddish or purple spot appears, attended with itching. In the course of twelve or fifteen hours at this spot a vesicle is formed, usually about the size of a pin's head, and filled with a reddish-brown or yellowish fluid. The vesicle is in general quickly ruptured by scratching, or it dries up within thirty-six hours, leaving the denuded skin dry, and mostly of a livid colour. Itching now ceases. Within twenty-four hours the centre of this discoloured part grows hard, and becomes surrounded with a number of small vesicles like the first. Within the areola the part is hard, depressed, and of a colour varying from yellow to black. There is now more pain than at any other stage. The disease is, however, in general unattended with severe pain. Within the next twenty-four or forty-eight hours the disease penetrates to the subcutaneous cellular tissue, and extends in circumference; in consequence of the induration of the affected parts, their limits can be determined without difficulty. The central brown or livid part soon becomes gangrenous, and if it cease to progress, the dead portion is surrounded by a circle of vivid redness, a sense of agreeable warmth is experienced, with a pulsatory motion at the seat of the disease. The pulse increases in strength, and to the fever and nausea there succeeds a gentle perspiration and quiet stomach. Suppuration now occurs around the dead portion of the pustule, these become detached, and a suppurating surface, varying in extent in different cases, remains. In unfavourable cases suppuration does not ensue; the gangrene extends from the centre to the circumference of the tumour; the pulse becomes smaller and more contracted; there is extreme lassitude, wakefulness, fainting fits, and complete indifference as to the result; disinclination for food or medicine; total loss of appetite. The tongue is dry and brown; the features are shrunk; the skin is parched; the eyes are glassy. Cardialgia and low delirium precede the fatal event; which takes place ordinarily in from five to eight days. In very malignant cases death takes place very promptly, with the manifestation of but few symptoms.

The disease varies somewhat in different cases. In some it assumes the form and runs the course of phlegmonous erysipelas.

It is laid down by those who have had the best opportunities for investigating the disease, that malignant pustule in the human subject is caused by an animal poison derived from diseased animals or their remains. Herbivorous animals affected with malignant carbuncle; cows affected with *trembles;* the flesh and blood of overdriven animals, or of those who have died of gangrene of the lungs. It is by contact with the bodies or blood of such diseased animals that usually man contracts the disease, though it is said that partaking of the milk, flesh, or

butter from such animals will likewise communicate malignant pustule. Although it is, perhaps, not true that the flesh, etc., of diseased cattle will give rise to that disease by introducing a specific poison into the system of those who partake of them as food, yet there are numerous facts on record which would seem to show very clearly that in persons nourished for any length of time upon the flesh of diseased animals, malignant pustule is especially liable to make its appearance.

Art. 14. *Strictures of the Urethra, and Means for their Treatment.* By Dr. JAS. M. MINOR, of Kings County, N. Y.—The main object of this paper is to recommend a form of metallic sound by which to facilitate the passage of small filiform elastic bougies. For a description and drawing of the instrument, with directions for its employment, we must refer to the paper itself.

Art. 15. *Strictures of the Urethra.* By Dr. J. H. HOBART BURGE, of Brooklyn, N. Y.—This paper is devoted to an account of certain improvements which the writer has made in an instrument for dilating strictures of the male urethra, which was described by him in the published Transactions of the society for 1861.

Art. 16. *A New Instrument*, proposed by Dr. J. H. HOBART BURGE, *for the removal of foreign bodies from the œsophagus*, and the other passages or deep cavities; for dilating the cervix uteri in cases of dysmenorrhœa; as a speculum for the ear and nose; as a probang, by inserting a piece of sponge between the blades; to convey a tape through the nostril, for the purpose of plugging the posterior nares; for the removal of nasal polypi; for the removal of the sequestrum in cases of necrosis; and as a useful surgical forceps generally.

The instrument is in the form of a pair of forceps, twelve inches long, with parallel blades, hinged together by a pivot, running the whole length of their straight portion about seven inches. The extremity of each blade is curved for a distance of five inches; the blades are perfectly smooth externally, but roughened on their inner surfaces, where they come in contact. The handles are at a right angle with the shaft. In the handle is a screw, by which the blades can be slowly and forcibly separated, and thus fixed.

Art. 17. *The Points of Election, and the Kind of Operation for Amputation of the Lower Extremities, with reference to the use of artificial limbs.* By Dr. DOUGLASS BLY, of Rochester, N. Y.—As far as this paper goes, the suggestions embraced in it are particularly sound. It is, however, not sufficiently elaborate to enable the surgeon to select the place and manner of amputating, so as best to adapt the stump for the application of a useful artificial limb. The saving as far as possible of the integrity of the movable articulations, and of the insertion of the muscles for the motion of the joint, is one grand desideratum. When joints cannot be saved, the amputation must then be performed, when practicable, so as to give ample room for the arrangement and motions of a firm practicable joint in the artificial limb supplied. The decision can only be made after a careful study of the form, mechanism, and mode of application of the latter, with reference to the nature and extent of the injury by which amputation was necessitated.

We believe with Dr. Bly that the antero-posterior double flap operation is the proper one to be performed whenever the surgeon has the privilege of choosing.

Art. 18. *Case of Suffocation, with Pathological Specimen.* By J. R. BOULWARE, M. D., of Albany, N. Y.—This is a very curious case. The patient, a boy, eight years old, subject during infancy to spasmodic croup, some time previous to his death had had an attack of pulmonary inflammation. Had for about two weeks complained of momentary attacks of pain about the centre of the sternum. Was seized in the evening with a severe attack of this pain, accompanied by an effort to vomit, with symptoms of choking. During the following night and next morning experienced several similar attacks. He went to play in the street. About an hour before noon he complained of feeling bad; he lay down upon a bed, seemingly occupied in studying his next day's lesson. Soon after he rose from bed and rushed wildly into the next room, violently agitated and struggling as though in a state of strangulation, with protruding eyes and livid face. He continued thus for a very short time, his struggles becoming more and more feeble until death ensued.

On dissection the only important lesions were those detected in the lungs and trachea. The healthy portions of the lungs were distended with air to their utmost capacity—when the thorax was opened they did not collapse, but bulged out of the pleural cavity. The upper third of the superior lobe of the right lung was hepatized; on the anterior surface of this indurated portion near the apex, was a cicatrix of a dense fibrous structure, an inch and a half long and a quarter of an inch broad near the middle, tapering to a point at each end. The surrounding pleural surface was considerably puckered. The lower lobes of the lung were healthy. The left lung, the tissue of which was healthy, was firmly adherent to the costal pleura. The indurated portion of the lung, when divided, was found to contain several encysted tubercles; some of the size of a small walnut and softened. The bronchial glands were enlarged. One as large as a hen's egg was situated just above the right bronchus between the trachea and vena cava; it was firmly attached to the bronchus and right side of the trachea. When divided it was found to contain a light grayish substance of a cheesy consistence. This and the deposit in the lungs presented under the microscope the usual characters of tubercle.

On carefully opening the trachea along its posterior wall, at its upper part was found a grayish body of a tough cheesy consistence, three quarters of an inch long, and having a circumference sufficient completely to plug up the cavity of the trachea. It pressed firmly against the rima glottidis and completely prevented the egress of air from the lungs—thus accounting satisfactorily for the distended condition of the air cells of the lungs, the symptoms of strangulation and the sudden death of the patient. On laying open the trachea as low down as the enlarged and adherent bronchial gland, an opening was discovered through the walls of the bronchus, communicating with the interior of the tuberculous gland. By this opening it is evident that the matter of the plug at the upper end of the trachea had been admitted into the cavity of the latter.

Art. 19. *Remarks on the Treatment of Hemorrhage on the Battle-field, with notice of a newly-invented Tourniquet for Military and Civil Service.* By Dr. Charles A. Lee.—Though there is nothing especially novel in the remarks of Dr. Lee, they are all particularly sound and practical, and may be consulted with profit by the large corps of military surgeons which the necessities of the civil war in which our country is now engaged have recently called into existence.

So great is the loss of life among troops engaged in battle from hemorrhage either immediately, or indirectly from the shock and exhaustion caused by it—and the almost impossibility of professional aid being afforded with sufficient promptness, to every one whose wounds have given rise to dangerous hemorrhage, that every officer and soldier of an army should be instructed as to the best and simplest means of arresting the flow of blood from a wounded artery; whilst it is made their duty, as far as circumstances will render it practicable, to apply these means sufficiently early to save life. Even though the means are in the majority of cases only temporary, death may be prevented in the greater number of instances, while the services of a large number of the wounded would be saved who would otherwise necessarily perish or after lingering for a long time in hospital be finally invalided.

The tourniquet recommended by Dr. Lee is the elastic tourniquet of Lambert, which has been introduced by authority into the American army, as a field tourniquet.

Art. 20. *Caries of Elbow-joint, Operation of Excision, with recovery of a useful Arm.*—The history of this case by Dr. Husted, of New York city, is a particularly instructive one. The patient's life was in all probability saved by the operation of excision; and what is better, she has been restored to health with increased strength, an elbow-joint with no particular deformity—having perfect flexion and extension and nearly perfect pronation and supination. The limb is shortened about two inches.

Appended to the paper is a history of the operation of excision of the elbow-joint drawn chiefly from the monograph of Dr. Hodges, of Boston, on excision of joints. According to the latter, excision in traumatic cases is a safer operation than amputation, whilst by it usually a limb of considerable usefulness may be preserved. Excision for anchylosis is only adapted to cases

where the arm is in a straight position or in one of extreme flexion. In excision performed in cases of diseased joint, death occurs once in nearly eight cases; and in its failure to remove the disease and preserve a useful arm, excicision fails once in three and a half cases. Partial excision, either for traumatic or organic lesions is a frequent cause of unfavorable results.

Art. 21. *Dislocation of the Femur into the Ischiatic Notch—Reduction by Manipulation—Death from Rupture of the Bladder.* By Dr. J. C. HUTCHISON, of Brooklyn, N.Y.—The patient, a labourer, 40 years old, was struck over the lower portion of the back by the bucket of an elevator which fell from a considerable height. The result was dislocation of the head of the right femur into the ischiatic notch, a fracture of the pelvis through the right acetabulum, and perhaps rupture of the urinary bladder. Death on the fourth day after the accident.

The chief interest of this case arises from the opportunity afforded by it for a dissection of the dislocated joint, after the head of the bone had been restored to its socket by manipulation.

On raising the gluteus maximus, a considerable quantity of extravasated blood was found beneath it; the portion of the muscle situated over the tuber ischii was ruptured, so as to make a depression large enough to imbed the tuberosity. Gluteus medius and minimus uninjured; lower edge of the pyriformis, gemelli, and the upper portion of the obturator externus lacerated; the capsular ligament lacerated posteriorly through one-half its extent; round ligament torn from the depression in the head of femur. The latter in its normal position in the acetabulum. On flexing the leg, which required considerable force owing to its rigidity, a fracture was revealed, by a loud crack; it was found to extend from the upper portion of the ischiatic notch through the acetabulum. There was no displacement, the fracture, probably at first incomplete, was made complete by the force used in bending the thigh. The bladder was ruptured at the fundus; no urine detected in peritoneal cavity; death caused by peritonitis.

Art. 22. A curious case is related by Dr. C. BURROWS, of Clinton, N. Y., in which an *oblique fracture of the femur*, just below the trochanter major, was caused in a lad by a violent attack of spasms of the limb.

Art. 23. *Polypus Uteri and its Treatment.* By WM. GILFILLAN, M. D., of Brooklyn, N. Y.—A case of uterine polypus which is related by Dr. G. leads him to examine generally the subject of polypous growths within the womb—their diagnosis, and means of removal, with especial reference to the ease with which they may be detached by torsion. Dr. G. urges the early removal of these growths in all cases when not contraindicated by coexisting pregnancy. When intra-uterine with undilated os, he recommends dilatation by sponge tents or other means, to prevent the loss of the patient from the repeated hemorrhages that would be liable to occur if the removal were delayed. Even when frequent uterine hemorrhage occurs, the cause of which is not apparent, he recommends artificial dilatation of the os and cervix uteri, so as to permit an exploration of the uterine cavity. He further believes that long and repeated hemorrhages and the so called menorrhagia may be caused by the presence of a small polypus in the uterus.

Art. 24. *Laceration of the Perineum, with destruction of the recto-vaginal septum; operation; Result, a strong perineum of normal breadth and thickness.* Case related by Dr. CHAS. C. F. GAY, of Buffalo, N. Y.—The operation performed in this case was that recommended by Dr. Marion Sims, with the addition of dividing the sphincter ani, and the postponement of the use of the rectal tube until the seventh day after the operation. Dr. Gay believes that the success of this case was mainly attributable to the employment of two sutures to hold together the bowel portion of the laceration.

Art. 25. *Case of Triplets.* Reported by G. FURMAN, M. D., of New York city.—There is nothing very novel or especially instructive in this case.

Art. 26. *Summary of Meteorological Observations made in the City of New York.* By Dr. J. P. LOINES.—This paper does not admit of any useful analysis. The same may be said in reference to the next paper.

Art. 27. *Abstract of Health Officer's Report, City of Brooklyn.* Communicated by Dr. MASON.

Art. 28. *A case of Enlargement of Spleen and Liver.* By L. Briggs, of Auburn. Communicated by Dr. Alden March.—Excepting in the obscurity which appears to have marked the etiology of this case, it does not appear to have differed in its leading features from the cases of extreme enlargement of the spleen and liver usually met with.

Art. 29. *Conservative Surgery; with a list of the Medical and Surgical Force of New York in the War of Rebellion of* 1861–'62. *Alphabetically arranged.* By S. D. Willard, M. D., of Albany. As an historical record this paper will be found hereafter deeply interesting, and not without a certain amount of value.

Art. 30. *Report of the Special Committee upon the United States Drug Law.*—The very able committee from which this report emanates—composed of delegates from several of the medical societies of New York, and from the New York College of Pharmacy—was appointed with the view of taking some decided action to secure, if possible, the proper execution by the federal administration, of the law "to prevent the importation of adulterated and spurious drugs and medicines."

The suggestions contained in the memorial presented by the committee to the Secretary of the Treasury are judicious, and if carried out would no doubt have more effectually secured the systematic and faithful execution of the law in respect to the inspection of imported drugs. The work undertaken by the committee remains, however, so far, unfinished, though we have, perhaps, some faint hopes of better success in the future.

Of the ensuing three papers we need only present the respective titles.

Art. 31. *Report upon the United States Pharmacopœia, February,* 1862.

Art. 32. *Report of a Special Committee upon Communications remonstrating against Homœopathy.* From the Oneida County Medical Society and the New York Academy of Medicine.

Art. 33. *Report of the Committee on Medical and Surgical Statistics.*

The volume closes with *Biographical Notices* of deceased members of the Society, and an abstract of the proceedings of the session of 1862.

2. The first of the communications of the Rhode Island Medical Society for 1862 is an address by Dr. B. Lincoln Ray, on the hereditary transmission of disease. The subject is handled by Dr. R. with great ability. From the facts and principles presented by him he deduces the following general conclusions, namely:—

"First. From healthy and unconsanguineous ancestors proceeds a posterity of which a *very large proportion* are born perfect, sound, and with tendencies towards healthy development and healthy procreation. Second. From unhealthy or consanguineous ancestors proceeds a posterity of which a *very much less proportion* are born perfect, sound, and with tendencies towards healthy development and healthy procreation. Or, to make the correlative statement: Healthy and unrelated ancestors produce a posterity of which but a *very small proportion* are imperfect or unsound; while unhealthy or related ancestors produce a posterity of which a *very much larger proportion* are imperfect or unsound."

The second communication is the history of a case of *rupture of the heart.* By Dr. Augustine A. Mann.—The patient, a farmer seventy-two years old, short of stature, and weighing 215 pounds, had for a period of four years suffered from rheumatic pains, especially during the winter. He was also troubled with shortness of breath on any slight exertion. During two years had gained much in flesh. February 19, 1861, he was suddenly seized with dyspnœa, a sense of constriction at the upper part of the chest, and a severe pain at the præcordia and in the left side extending to the arm. It was especially severe over the region of the heart. Pulsations of the latter 120 per minute, full, strong, and occasionally bounding. The cardiac sounds well defined and distinct, but feeble when compared with the impulse of the organ and the pulse at the wrist. For a few days there had been a slight cough, but no chill, fever, or pain in the shoulder. Sleep rather restless. By the next day the pain had extended to back and lower limbs. The difficulty of breathing not increased by the recumbent position. Stricture of chest gone. During the night there was a short hacking cough, with mucous expectoration streaked with blood. No bellows

sound of heart. Posterior lobes of lungs gave, upon auscultation, a distinct, coarse, mucous râle. There was no dulness upon percussion. Centre of tongue covered with a dark moist fur. The patient gradually improved up to the 23d, when he considered himself nearly well. Two days later, in the evening, he was supposed to be dying. He was pale and haggard, and suffered from extreme dyspnœa; his forehead was bathed in sweat. He complained of severe pain at the apex of the heart. His breathing was irregular; he felt a sensation of stricture at the upper anterior part of the chest. Pulse 60, feeble, small, and irregular. Sounds of heart feeble and indistinct, with a faint, continuous, ringing tone. Slight mucous râle heard in the lungs. It was very distinct, however, next day, at the upper anterior portion and the lower posterior portion of the chest. Expectoration as before, and abundant; dyspnœa less, but breathing still short and rapid. Some nausea. Tongue has a thick, dark, dry coating; urine scanty and high coloured. The patient gradually improved up to March 1st, when Dr. Clapp saw him. He agreed with Dr. Mann, that the case was one of cardiac disease, probably fatty degeneration. No effusion was detected in either of the cavities. Pulse 88, small, feeble, irregular; tongue dry and furred; urine scanty. Twelve days later, œdema of the lower extremities; at the end of three days, there was probably an effusion into all the large cavities. Cough and expectoration slight; pulse 90, improved in character; tongue moist, with dark fur along its centre; urine scanty, high coloured. The patient became soon weak and unable to sit up; had pains in the cardiac region, with stiffness and soreness of limbs. Dyspnœa intense upon the slightest exertion; countenance expressive of pain and anxiety; delirium at night. On evening of March 18th, all the symptoms more urgent. Severe pain of heart, left side, and arm; intense dyspnœa; extreme paleness; dilated pupils; free perspiration. Pulse at wrist could not be felt; heart beat feebly, about 60 strokes a minute. Next morning the symptoms were less urgent. Legs much swollen; increased effusion in chest; expectoration much tinged with blood; more distinct râles; great dulness of chest on percussion; pulse irregular, scarcely to be counted. But slight change occurred until April 1st, when the weakness and dyspnœa were extreme; the delirium greatly increased; pulse more feeble and irregular. The patient now sank rapidly, and died on the evening of April 5th.

The following are the lesions discovered after death in the chest, and the only ones of importance: In the pleural cavities about two quarts of serum; some adhesions of the left lung to the costal pleura. The entire pericardium firmly and closely adherent to the surface of the heart. Heart large, surrounded with much fat; its muscular tissue soft and easily torn. The aorta, for three inches, dilated to nearly twice its usual size; no sign of obstruction in any of its branches. Walls of right ventricle very thin and soft; its cavity large. Left ventricle partly filled by a large fibrinous clot, weighing nearly three ounces. In the upper and anterior part of the wall of this ventricle a cavity was found containing about two ounces of dark offensive pus; between the cavity and ventricle the fibrinous clot formed a septum. The walls of the ventricle were very thin, particularly near the apex, as was also the intra-ventricular septum. The muscular tissue covering the cavity containing pus was extremely thin.

Cholera Infantum. By Dr. W. Owen Brown, of Providence.—This is a very good exposition of the treatment of the disease. It presents nothing, however, especially new. In the chronic form where the leading symptom is diarrhœa, the stools being watery and of varying consistency and colour, with extreme marasmus, there can be no doubt that quinia and iron are among our most valuable remedies. Spirits of turpentine in such cases, when judiciously administered, will often be productive, promptly, of the best effects.

Supplementary Mammæ.—A case of this rare anomaly is related by Dr. H. E. Turner, of Newport. Coincident with the secretion of milk in the mammæ, in a female recently delivered of her first child, a gland in each axilla became enlarged, and secreted milk in such quantity that a decided stream could be impelled to a considerable distance. There was neither nipple nor areola. The largest of these glands was of the size of a large shellbark; the other was rather less. They had all the appearance of distinct supplementary mammæ.

Paralysis following Diphtheria. By Dr. G. L. Collins, of Providence.—The patient was a boy two years and a half old. Three weeks after he had been discharged well of diphtheria, he was attacked with cough, hoarseness of voice, and a failure of muscular power. A week later the symptoms were as follows: Cough, with frequent paroxysms of severe dyspnœa; voice almost extinct; when erect, the head fell from side to side; the chin usually rested upon the sternum, until the centre of gravity was changed; upper eyelids drooped over the eyes, and could not be raised by an effort of the will; pupils largely dilated; sight and hearing undisturbed; countenance devoid of expression; power of muscles of upper extremities unaffected; muscles of legs totally paralyzed; rectal sphincter not materially paralyzed, that of the bladder wholly so; the urine not albuminous, but loaded with earthy phosphates; difficulty of swallowing fluids, a portion of them often regurgitated through the nostrils; power of memory apparently lost. The patient was put upon the use of citrate of iron, was bathed daily in sea-water, was allowed to partake freely of nourishing food, though for a time only a small quantity could be taken because of the difficulty of swallowing. After the symptoms had continued for some days to increase in extent, they remained for a short time stationary, and as gradually improved. The paralysis had nearly disappeared at the end of eight weeks from the period of its commencement. The patient was still, however, somewhat feeble and anæmic. After a short residence in the country, he was completely restored to health.

Notices of Dysentery in the year 1861, compiled by Dr. C. W. Parsons.—During the summer and autumn of 1861, the dysentery appears to have prevailed pretty extensively in nearly all of the villages of Rhode Island, situated along the Pawtuxet River and its branches. The symptoms and course of the disease presented nothing very peculiar. It was not attended by any severe mortality. In respect to treatment, Dr. Parsons remarks, "that the cases of dysentery which prevailed at the period and places indicated, were marked by great collapse of the surface, clammy perspiration, and general prostration, rendering it almost always necessary to combine with the remedies more especially appropriate to the disease a stimulating tonic." Dr. P employed the syrup of rhatany and whiskey; and, he informs us, with the best results. For the collapse and debility of the general system he used tannin combined with opium and ipecacuanha, with an alkaline mustard wash. He reprobates the too free and indiscriminate use of opium. He considered it a most important remedy but would have its employment watched and guarded with the utmost vigilance. In some instances the dysenteric symptoms yield very suddenly under the use of opium. In these a continuance of the remedy beyond the necessary point is liable to be attended with serious consequences.

Report on Surgery. By Dr. H. E. Turner, of Newport.—The report embraces three cases. The first case is one of comminuted fracture with depression of the skull. Dura mater uninjured. No reaction occurred. Death took place, without return of consciousness, at the end of thirty-two hours. Dr. T., queries whether those cases of injury of the head in which the dura mater is not torn, are not more liable to terminate unfavourably, than even apparently more extensive injuries, where the dura mater is divided, hernia cerebri being produced, or even a portion of the cerebral substance destroyed. The second case is one of tumour on the side of the pelvis, occurring after an injury in an adult male. Sloughing having taken place at two different points in the tumour, it was extracted by the knife. It was of a firm, cartilaginous structure, and weighed about a pound. The patient had a favourable recovery.

The third case is one of dry gangrene of the right foot, in a man forty-eight years of age, from extensive ossification of the arteries of the right lower limb. Amputation was performed at the earnest solicitation of the patient, below the knee. On the sixth day after the operation, tetanus set in, and the patient died on the succeeding day.

Examination of Recruits, with Medical and Surgical Cases. By Dr. J. Gardner, of Providence.—The most interesting portion of this report is that in reference to *typhoid pneumonia*, which, at one time, it was feared would be quite prevalent among the soldiers. Nine cases of the disease occurred nearly simultaneously. Seven were in the hospital, and two in the city, all being mem-

bers of one command quartered in the arsenal. All had at first catarrhal and gastric symptoms; these were followed by stupor, more or less delirium, pain, dyspnœa and cough. The pain was sometimes acute, at others more or less obtuse. It sometimes extended to both sides of the chest and to other parts of the body. The expectoration was invariably more or less mixed with blood giving it a brick-coloured appearance. Pulse at commencement of attack generally full, but weak and compressible; after the sixth or seventh day it became more frequent, from one hundred to one hundred and twenty, small and very feeble; skin hot and dry; tongue coated with brownish fur, very dry in the advanced stages; teeth and gums more or less encrusted with dark sordes. While the morbid phenomena varied somewhat in different cases, the same leading characteristics were present in all.

In respect to treatment. When the arterial excitement was considerable, and the inflammatory symptoms were intense, a careful and persistent use of the veratrum viride was found to be a useful and potent remedy. In one case, the pain was so intense and continuous, that venesection was resorted to with the most beneficial results. With these remedies were given, every four hours, a combination of one grain each of ipecac and opium, and from one to two of calomel, alternated with expectorating and demulcent beverages. By the fifth or sixth day of the disease the calomel, opium and ipecac, were suspended. If there still remained pain and dyspnœa, sinapisms and epispastics were indicated followed at bedtime by ten grains of Dover's powder or a sufficient dose of anodyne balsam (?) to procure sleep. Subsequently the acetate of ammonia was given every three or four hours, alternated with one to two grain doses of quinine, with beef tea, wine whey, etc.

All but one of the cases recovered. The fatal one assumed a chronic character, and the patient was transferred to his native city, Boston, where he subsequently died.

3. The printed *Transactions of the Medical Society of New Jersey, for* 1862, open with the address of the President, Dr. J. BLANE. His theme is "The Medical Society of New Jersey, and the objects and duties of the physicians and surgeons its members." It is very well handled. The address is replete with interesting historical reminiscences, and with suggestions which, if carried out by those to whom they were addressed, cannot fail to eventuate in the permanent good and honour of the profession of which they are members.

In the report of the standing committee we are presented with a brief summary of the reports received from the several district societies. From these several reports we learn that *scarlatina* prevailed to some extent over a large portion of the State of New Jersey. The disease varied in its severity and fatality in different localities. No new facts in reference to the disease are given calculated to throw additional light upon its pathology or treatment.

Diphtheria, also, has been very prevalent in many parts of the State, exhibiting the same variety in respect to its severity and fatality. Generally speaking, it has been less malignant than during the two preceding years. In one district the deaths were mostly from prostration of the vital powers. In another from obstruction of the trachea. In one place in many of the cases, whether fatal or otherwise, sore spots occurred on the fingers and toes, with exudation, extremely obstinate under treatment. The sequelæ of the disease, as far as noticed, were great nervous prostration, loss of voice, paralysis of muscles of throat, causing difficulty in swallowing fluids, these being often ejected through the nose. In one case there was occasional total blindness, which lasted for six weeks.

In respect to the treatment of diphtheria there is a very general agreement as to the propriety of supporting and antiseptic measures; but a difference of opinion exists as to local treatment. Severe local applications to the throat are condemned by many. The deposit being the local manifestation of a constitutional disease, and death resulting, excepting in croupal cases, from the toxæmic effects of a poison, no good can result, but, on the contrary, much injury, from attempting its artificial removal. A saturated solution of tannin, applied with a camel's-hair pencil, or the frequent application by the same means of a chlorine mixture, will be found more generally beneficial than more severe remedies. A powder

composed of equal parts of chlor. potass. and rock candy rubbed together and put upon the tongue every half hour is an excellent application, especially in cases of children.

Rubeola has been less than usually prevalent, but with no distinguishing features requiring notice.

Variola has prevailed to a very great degree in some portions of the State. Generally speaking the amount of mortality produced by it has not been very great. The epidemic has revealed the fact that there is a very large proportion of the population of New Jersey that has not been vaccinated.

An affection variously styled *Malignant Pustule, Malignant or Carbuncular Erysipelas*, is noticed as having occurred in Hunterdon and Essex Counties. Some eight cases are reported, of which *two* occurred in May and June, 1851; *five* in July, 1861, and *one* in August. In all cases the disease occurred upon the upper lip, and sometimes upon the nose also, causing enormous swelling of these parts and of the face and neck, in some instances very painful, in others almost painless. The disease was of a highly malignant character, and generally fatal in its termination. The disease appears in the form of a pimple of the size of a pea, of a livid colour and hard to the touch. General system in some cases but little affected. Dyspeptic symptoms and fetor of breath commonly present. Some few cases were attended with restlessness, great distress, irritative fever, headache, etc. Death in some cases was preceded by coma. We gain little that is reliable in respect to the treatment of this affection, nor in regard to its true character and etiology.

From a careful review of the facts set forth in the reports from district Societies bearing upon the *history of malaria* in New Jersey, the following general conclusions would appear to be fully sustained:—

1st. That there is a general subsidence of malarial diseases throughout the State, and in almost all the counties from which reports have been received, intermittent fever may be said to have ceased to appear.

2d. That swamps, ponds of water, and streams liable to overflow their banks are universally regarded as the prolific causes of miasm, while the drainage of the country, etc., and the cultivation of the reclaimed soil are as universally regarded as the certain means of its extinguishment.

3d. It is nevertheless manifest that these local causes are not at all times equally potent in the production of malaria, but that other and more hidden influences are to be looked to as equally efficient in its development. Some law of periodicity would seem to govern the rise, progress, and subsidence of epidemics, the cycles of which are governed by causes which are yet to be discovered.

4th. It is a common observation that when intermittent fever ceases to prevail, remittent and continued fevers take its place. This has been observed in the alluvial districts of New Jersey, and in the more recently settled portions of New York and Pennsylvania.

Independent of the history of the prevalent epidemics of the year 1861, the reports from the district Societies contain the history of a number of interesting cases, both medical and surgical, and many observations in reference to the endemic and sporadic diseases which fell under the notice of those who contributed to their preparation.

Dr. Pierson, of Essex, details a case of *Pyæmia*. It occurred in a male, 20 years of age, from, it is supposed, suppressed gonorrhœa. When seen by Dr. P. he was suffering from irregular chills and fever. He was about, but very weak and staggering in his gait; experienced almost constantly a dull aching pain in the iliac region and in the right shoulder; the rigors increased constantly in severity, with fever and profuse perspiration; the pain extended to the region of the liver; the debility continued. In twenty-eight days after Dr. P. saw him he died with all the symptoms of typhoid fever.

Dr. J. S. Martin, of Middlesex, reports a case of *Strangulated Hernia* in a female 61 years of age, which produced sloughing of the abdominal walls, which finally healed with a restoration of the natural outlet. Since her recovery four years have elapsed, during which period she has enjoyed entire health, and though living an active life, has not experienced any inconvenience in the part where sloughing occurred.

Dr. GOODENOUGH, of Monmouth, notices a case of *Anasarca* which occurred at the seventh month of a first pregnancy. The most distressing feature of this case was the enormous infiltration of the labiæ externæ, which, with the distressing pruritus and smarting, forced the patient to lie upon her face to obtain any rest. The only remedy from which relief was obtained was the subnitrate of bismuth, dusted upon the parts after they had been washed with tepid milk.

Dr. A. B. DAYTON, of Monmouth, describes the case of a woman, 80 years of age, in whom the *distension of the bladder from retained urine* caused a complete mechanical obstruction to the passage of the feces, giving rise to enormous intumescence of the abdomen and great distress. No passage from the bowels could be obtained until the bladder was emptied by means of the catheter, when a free stool immediately ensued.

Besides the reports from the District Societies we have one from the Scientific Committee on the question, "Can nervous diseases be considered less mechanical or chemical than other organic complaints?" The committee are of opinion that a large majority of nervous diseases are not, strictly speaking, organic, but functional, sympathetic, symptomatic.

"Because," they remark, "we do not fully understand certain nerve phenomena there is no occasion to presume that they are the results of mechanical or chemical change. It is better always in the theories of medical science to await the accumulation of facts and the proofs of practical experience rather than classify too hastily. It is better that medical facts should stand on the cold border-land, unclassified, than be forced into rank and file before their proper place is clearly ascertained."

The report closes with an extract from a letter written by C. Handfield Jones to a member of the committee, which contains some excellent remarks on the question under discussion. The extract is as follows:—

"As to whether the nerve cells and fibres are not morbidly changed in their molecular composition in nervous diseases, I can only say that the case seems to me not proven. Function and structure do not appear to be *very* closely linked together. In the neurolytic form of paralysis all the phenomena are those of debility, plain and unmistakable; the treatment that benefits is tonic and stimulating, such as seems to act by arousing and increasing the natural vital endowment, not by removing some impediment to its exercise. When we administer hydr. bichloride in chronic cerebral affections, or pot. iod. in rheumatic cerebral disorder, it is very probable that we do act on the affected tissue in a way of changing its composition. But when we still delirium with opium, or prevent fatigue with the same narcotic, or remove a palsy by strychnine or galvanism, the action appears to me to be more purely dynamic. The same, I think, must be true of malarious disease. Quinine is no antidote for malaria; a man may be saturated with the drug and the poison remain in full force. Quinine seems only to do in ague what it does in various other instances, namely, impart a tone and force to the nervous system, enabling it to withstand the morbid agency. In the same way it acts as a protective, and this action, which is very significant, is paralleled by that of mental stimulus. Excitement and animation will preserve men from succumbing to malarious disease as surely as depression will promote its injurious effects. All this, to my mind, is much more like dynamic than organic alteration. I know of two instances where persons resided a long time in aguish districts, numbers being affected around them, yet they had no symptoms of disease until they left the locality, and then they both had it. In these instances it is certain that either the nervous structure was altered during the residence, or that it was not. If it was, then we have change of structure without symptoms; if it was not, then the symptoms, on removing, must have been owing to some dynamic change. The production of convulsions by ligature of the arteries, of paraplegia by peripheral irritation, ceasing on the removal of the latter, looks to me much more like disorder from dynamic than from organic alteration. One can hardly suppose that the gray cerebral matter is instantaneously modified in its composition by the interruption of the circulatory current, although it must feel the loss of the blood pressure. So, if a paraplegia is rapidly improved by the removal of a distant irritation, it seems reasonable to suppose that the nervous centre was only embarrassed in its act-

ing, not changed in its structure. A more perfect knowledge of the action of remedies, which seems to me the great desideratum of the day, will aid us much in deciding the question."

The present volume of *Transactions* closes with a brief biographical notice of Frederick S. Weller, M. D., of Patterson, N. J., by Dr. A. W. Rogers.

4. The annual address delivered before the Pennsylvania State Medical Society, at the opening of its session of 1862, by the President, Edward Wallace, M. D., of Berks, is a very neat production, and in its sentiments well timed; whether viewed in reference to the imperfect representation, at the sessions of the State Society, of the medical profession in Pennsylvania, or to the existing condition of the latter, and the duties which are incumbent upon its respective members to raise its efficiency and character, and secure its true interests.

The address is followed by a well written and well conceived circular, addressed to the physicians throughout the State, urging upon them to perfect the organization of the profession everywhere into county societies.

Reports were received from only eight counties. From those we learn, that through all those portions of the State the sanitary condition of which they represent, the years 1860–61 were marked by the general prevalence of good health. There was an absence of any wide spread, malignant epidemic, and even the endemic maladies, and those of occasional occurrence, were more rare, generally speaking, and milder in character than during the one or two years preceding. It is true that in Philadelphia the bills of mortality would appear to show an increase of disease during the year 1861 over that of 1860. This increase is, however, more apparent than real. The seeming increase of mortality in 1861 is in a great measure to be accounted for by the fact that the registration of deaths has become much more accurate than formerly. It is probable, however, that there has been an actual increase of mortality, from various causes; the influence of each of these has been slight, though in their aggregate the influence they exercise upon the mortuary statistics is well marked. Many of the three months' volunteers, and others of our soldiers, it must be remembered, have returned to their homes to die, in consequence of diseases contracted during their camp life.

Periodic fevers, though frequent in some parts of the State during the autumns of 1860 and 1861, were by no means so prevalent as formerly. In portions of Bradford County, intermittents prevailed to some extent complicated with congestion of the pleura and lungs. None of these cases, we are informed, terminated fatally.

Dr. Luden, in the report from Huntingdon County, remarks that *intermittent fever* was formerly considered a regular yearly endemic of that portion of the county, especially, which extends along the Juniata River and Pennsylvania Canal, from two to three miles on both sides. About 1855 or 1856, from some inexplicable cause, it suddenly ceased in that tract of country, and appeared for one season about four miles more inland on both sides of the river. The disease then disappeared, or nearly so. During 1861 a few cases of ague were met with among the boatmen on the canal, who had probably contracted the fever at some other place. In May, 1862, only two cases—a quotidian and a tertian, were seen by Dr. Luden. The patients were both residents of the county, and close to the canal. Cases of *remittent* fever, he states, were observed here and there, in every direction, but comparatively few in number. Infantile remittent was frequently met with.

From nearly every part of Montgomery *periodical fevers* have of late years been disappearing to a very striking extent. Speaking of the Schuylkill region generally, but more particularly of Plymouth and Whitemarsh valleys, Dr. H. Corson remarks, that thirty years ago that section of country was inundated with remittent and intermittent fevers. They continued to increase in prevalence up to 1832, when the cholera appeared and seemed to supplant them, or at least in some particular manner to modify them, so as to render their occurrence less frequent and their character less severe for the few succeeding years. They nevertheless continued to prevail to a considerable extent until 1849. Since then they have gradually declined, until they have almost wholly disappeared.

"I remember very well," says Dr. Corson, "when the ague first spread itself among the people along the Schuylkill River, from Norristown to the Falls of Schuylkill. It was attributed to the 'fresh dirt' thrown out in digging the canals. That this was not the cause I think is likely, from the fact that more fresh dirt is now thrown out every year, in the same neighbourhood, in the digging of iron ore, than in making a short canal. The latter occupied only one summer, the former is carried on annually. There has not been much change in the agriculture of the region; the proportion of woodland to farmland is also nearly the same, so also the drainage. There was no swamp land then, when not a house escaped the fever; nor now, when not a house is visited. At Conshohocken, a large milldam, then kept well cleaned, is now nearly filled up, and the water so shallow, that in summer time, if long without rain, nearly the whole surface becomes a mass of drying mud and putrefying vegetation, and yet, though a number of poor families live on its very margin, and the eastern margin too, no fever, nor fever and ague prevails. Instead of these malarious affections we now have occasional typhoid fevers and the other diseases which usually prevail in places where formerly ague prevailed."

In Philadelphia County *intermittent fever* has become of very rare occurrence, *remittents*, also, are unfrequent diseases. This is owing mainly to the filling or draining of the ponds of stagnant water which were so common in all the suburbs —to the improvement of the river banks, the extension of paving and sewerage, and the occupation by houses of the former vacant uncultivated lots.

Typhoid fever, though noticed in all the reports, does not appear to have been so prevalent in any section of the State during the last two years as during those immediately preceding. The disease appears to have been milder also in its character.

Scarlet fever prevailed in nearly all the localities embraced in the reports presented to the Pennsylvania State Medical Society at its late session. It varied very much in its character in different sections of country. In Beaver County, among the villages near the mouth of the Beaver River, and in their vicinity, some cases seemed to be modified by, or complicated with, diphtheria. The general symptoms were those of scarlatina, while the affection of the throat was that of diphtheria. In families of five or six children, one or two would have the diphtherious deposit in the throat while the others would have a severe attack of the fever unaccompanied by the disease of the throat.

Dr. Galbraith, of Perry County, says he had to treat only a single case of scarlatina—the disease was well marked, mild in character, and ran regularly through its several stages. It occurred in a delicate scrofulous girl, 13 years of age. Scarcely had she recovered from the attack of scarlatina, when she was attacked with erysipelas occupying the face. The attack was mild and soon terminated favourably. The desquamation consequent upon the scarlet fever went on as usual, and the patient was restored to her usual health.

In Philadelphia a pretty severe epidemic of scarlatina occurred in 1860, and in 1861. In this latter year it produced a very heavy amount of mortality—namely, 1190 deaths. The disease was generally of a low grade. The eruption was slow in appearing and less marked than usual. The affection of the throat was often the first symptom to appear, and of the longest continuance. Very many of the fatal cases were marked by an affection of the brain. In a few cases the patients were seized with convulsions at the very onset of the disease, on recovering from which they fell into an ataxic condition, or became comatose and died within the first, or at furthest, the third day.

In some portion of nearly all the counties from which reports were received, the occurrence of *measles* is noticed; in general the cases were few in number and mild in character.

Dr. Winans, speaking of the disease as it prevailed in Beaver County, among the villages at the mouth of the Beaver River, remarks, that the only peculiarity observed in respect to it was the tendency to a reappearance of the eruption, after it had apparently passed through its regular course. The usual symptoms of measles were present until the subsidence of the febrile symptoms, when, however, the eruption had almost disappeared, febrile symptoms would set in, the eyes become red and watery, and the usual phenomena of the disease be-

come again manifest. In from two to three days a well-marked rubeolous eruption would reappear and pass through its regular course. The second or recurrent attack was in general more severe than the first.

Dr. G. W. Allison, of the same county, reports a case of measles in a new-born infant. At the time of her confinement the mother was in the eruptive stage of the disease, with high fever and violent cough. The labour was severe and tedious. At birth the face and back of the infant were covered with an eruption similar to that of the mother. It was more distinct on the next day, and had then spread over the body and extremities, it now commenced gradually to disappear; first on the face. The infant had no catarrhal symptoms; was feverish and restless for a day or two. It finally did well.

In a portion of Perry County, Dr. Galbraith states that a very severe epidemic of measles prevailed during the latter part of the year, severe, so far at least as symptoms were concerned, but not particularly fatal. The pulmonary organs were those chiefly affected. Congestion and severe irritation of the lungs, and sometimes bronchial inflammation, were certainly, according to Dr. G., the most frequent complications of the disease. Quite a number of cases occurred in persons near the adult age, and some in those considerably older, who asserted that they had had previous attacks of measles.

While in the interior of the State, *smallpox* appears not to have prevailed during the years 1860–61 to any very alarming extent; in Philadelphia a very large number of cases were constantly met with and still continue to be met with. In 1861 the number of deaths produced by it was 758. Its occurrence in Philadelphia is due mainly to the introduction of the contagion from abroad, and the great neglect of vaccination and revaccination, more especially by the poor and labouring classes, while its spread and destructiveness, when once it had gained a footing in the community, are to be referred to the crowding together in badly ventilated and unclean neighbourhoods, of a population, a large portion of which have their systems broken down from bad diet, intemperance, exposure, etc.

A fact is recorded by Dr. Luden, of Huntingdon, showing how cautious we should be to see that all sources of contagion are got rid of, before the removal to a healthy house or locality of persons who have had the smallpox, even some time after their entire recovery from the disease. A single case of the disease, only, occurred in that borough, he remarks, during 1861. The patient was an elderly female, who said she was vaccinated many years previously. Her granddaughter, three years old, had the smallpox in Philadelphia early in December. She was removed to Huntingdon in the latter part of February. The attending physician assuring her parents that there was no danger of her carrying with her any contagion. Shortly after her arrival, the grandmother became ill. So soon as it was ascertained that the attack was one of smallpox, the child was removed to her grandfather's in the country, and he also, shortly after her arrival, was attacked by the same disease. Vaccination was immediately resorted to, and was effectual in preventing the further spread of the disease. The old lady died on the fifteenth day of her illness, without having had any regular medical attendance. The grandfather, who had never been vaccinated, recovered.

In the Philadelphia County report, the opinion is advanced that the susceptibility of the human system to the *vaccine influence* is increased during the prevalence of smallpox. We have seen nothing within the sphere of our observation which would lead us to such a conclusion.

It is remarked of the disease, as it occurred in Philadelphia, that unlike the usual course of epidemics of that and other diseases—augmenting gradually from their onset to the period of greatest height and intensity, and then gradually declining until they entirely cease—the smallpox, after having declined for several months, suddenly underwent, towards the close of the year, without any appreciable cause, a remarkable augmentation, and then, soon after, as sudden a diminution.

Diphtheria prevailed throughout the State, differing in its extent and malignancy in different localities. In Beaver County the disease assumed, in most instances, a mild character, and terminated favorably under a judicious treatment.

The most successful is reported to have been, mild laxatives; the application to the fauces, once in six or eight hours, of a wash composed of tincture of the muriate of iron, muriatic acid and distilled water; three drachms of the first, one of the second, and four of the third. For internal use, in a child three or four years old, one drachm of the above mixture, in two ounces of water, given in teaspoonful doses every two hours, with the addition, if there is great debility, of one grain quinine to the alternate doses. In the intervals between the doses of the above, a teaspoonful of a solution of two drachms chloride of potass in four ounces of pure water. Spirits of turpentine to be applied to the throat externally.

The disease was also of a very manageable character as it appeared in some parts of Bradford County. Nothing especial is noted in respect to treatment. The application of a mild solution of the nitrate of silver to the throat appears to have been very generally practised. Gargles of salt and vinegar are commended: externally, the application of strong spirits of camphor is the favourite application of Dr. Horton. Internally, the chlorate of potass was given freely. When symptoms of depression ensued, quinine and tincture of iron were given. Twenty grains of the first in an ounce of the latter were administered in doses varying with the urgency of the case.

In Bradford the worst cases of diphtheria occurred upon the hills and mountains a mile or more from the river; in the same localities where, ten years ago, agues were most frequent and obstinate. Very few of the cases assumed a decidedly asthenic character.

Dr. Luden, of Huntingdon, claims great success from the following treatment: He first directs the administration of a saturated solution of muriate of sodium, given warm and copiously until free emesis is produced. It will act also upon the bowels. It may be repeated, if circumstances call for it, in the course of the disease. After this, he gives internally a solution of chlorate of potass, or diluted muriatic acid, and later muriated tincture of iron, alone or with quinine, as the case may seem to require. Dr. Luden doubts the propriety of the application of nitrate of silver to the diseased fauces; he prefers, as a local application, the saturated solution of muriate of sodium, with this he directs the whole interior of the mouth to be well swabbed three or four times a day. Externally, he applies around the neck a small bag filled with warm salt.

Dr. Corson speaks, from ample experience, in favour of cold water, iced water, and ice externally and internally applied in cases of diphtheria and in the throat affections of scarlatina. He pronounces it to be "more valuable than all the other local means in use." And when "the commencing affection of the brain is promptly met by the use of the same means to the head, in such decided applications as the case needs, we have a treatment which will seldom fail."

Dr. Galbraith, of Perry County, when speaking of his experience in the treatment of diphtheria, very properly, in our opinion, repudiates the indiscriminate application to the throat in this disease of nitrate of silver, as a practice calculated to do, upon the whole, far more harm than is compensated for by the advantages derived from it in the few cases to which it may be applicable.

A very full account of diphtheria, as it appeared in our midst, by the author of the present notice, is comprised in the report from the Philadelphia County Medical Society.

Dysentery is reported to have been epidemic, during 1861, in portions of Bradford County. In one place, at least, where it had not prevailed for twenty years before. Dr. Horton speaks very pointedly of the bad effects of opium and astringents in its early stage. Dr. M. Miller, of Huntingdon, on the contrary, describing a very inflammatory form of the disease which prevailed epidemically in the northeastern portion of his county, attended with intense tormina and tenesmus, discharges of bloody serum mixed with whitish flocculent matter, and large flakes of false membrane; great tenderness of hypogastrium, difficult micturition, etc., remarks, that the treatment which seemed most satisfactory to him, consisted of "large doses of opium and ipecacuanha," to control, as far as possible, the tormina and tenesmus. In the first stage, he gave nitre and spirits of nitre freely, with veratrum viride, until the acute symptoms subsided. As a laxative, he gave castor oil, or a saturated solution of Epsom salt and

elixir of vitriol, in doses, for an adult, of a tablespoonful of the first, with fifteen drops of the last, every four or six hours until feculent stools appeared.

In Bradford County, *erysipelas* appeared to a limited extent. In one case, Dr. Horton tells us it began as regular diphtheria. The face and scalp were greatly swollen. The case terminated favorably. It was treated locally by the tincture of iodine. Dr. H. remarks that, all during the winter of 1861–2, in cases of wounds, a strong tendency was observed to erysipelatous inflammation.

In Perry County, Dr. Galbraith refers to several cases of erysipelas, which fell under his care in 1861, one of which was of a very intense grade, and attended with much suffering; it commenced at the right ear and extended over the entire face and head. There was also severe affection of the throat, which, for a time, rendered deglutition almost impossible. The other cases were not so severe. They all recovered.

In respect to the connection between erysipelas and puerperal peritonitis, Dr. Galbraith is so far aware of it, as, when the former disease is prevailing, to be "ever on the watch for peritoneal inflammation in his puerperal cases." Dr. G. has witnessed several epidemics of puerperal fever. The severest was in the winter of 1849–50, and the spring of 1850. Preceding the epidemic, and in conjunction with it, there occurred in his practice many cases of erysipelas of a very severe grade, and every case of parturition he was called upon to treat was followed by peritonitis of a very severe and frequently fatal character. In the beginning of June, this state of things ceased, and for several years severe cases of erysipelas ceased to be met with, and cases of puerperal fever were not observed until towards the close of 1861, and the first four or five months of 1862, when erysipelas again made its appearance, and during the same period cases of puerperal peritonitis were repeatedly met with. Though several of the cases were prolonged, they were upon the whole mild and readily yielded to treatment. Dr. G. does not pretend to explain the nature of the connection between constitutional erysipelas and puerperal fever, but "that it does exist, and that observation in the course of his practice establishes the correctness of such conclusion, is the solemn conviction of his mind."

Hooping-cough seems to have prevailed pretty extensively in Pennsylvania, during the last two years. The uncomplicated cases all terminated favourably. In Huntingdon, throughout 1861, and up to May, 1862, it was observed that in several localities hooping-cough and measles alternated each other. At the first the former taking the precedence, but later one or other would precede in different families, but their disposition to alternate with each other was always evinced.

The chief and most serious complications observed in cases of hooping-cough were those of the lungs and brain, the first were the most frequent and fatal.

To several of the county reports are appended short Biographical Notices of deceased members of the societies from which they emanate. D. F. C.

ART. X.—*Reports of American Institutions for the Insane.*

1. *Of the United States Government Hospital, for the fiscal year* 1859–60.
2. *Of the Northern Ohio Lunatic Asylum, for the fiscal year* 1860–61.
3. *Of the Long View Lunatic Asylum, for the fiscal year* 1859–60.
4. *Of the Western Asylum of Kentucky, for* 1861.
5. *Of the Iowa Hospital, for the year* 1861.
6. *Of the Wisconsin State Hospital, for* 1860–61.
7. *Of the New Hampshire Asylum, for the fiscal year* 1860–61.
8. *Of the Massachusetts Hospital, at Taunton, for the fiscal year* 1859–60.
9. *Of the Massachusetts Hospital, at Northampton, for the fiscal year* 1859–60.

BEFORE proceeding to an examination of the several reports with which we have been favoured, we seize the opportunity thus early to present to our readers the numbers of insane and idiotic persons in the several States, as reported in

the National Census of 1860. We are enabled to do this through the kindness of J. C. G. Kennedy, Esq., the able Superintendent of the Census, who has furnished us with a copy of these numbers in advance of publication.

States.	Insane.			Idiotic.		
	Free.	Slave.	Total.	Free.	Slave.	Total.
Maine	704		704	658		658
New Hampshire	506		506	336		336
Vermont	693		693	263		263
Massachusetts	2,105		2,105	712		712
Rhode Island	288		288	101		101
Connecticut	281		281	226		226
New York	4,317		4,317	2,314		2,314
New Jersey	589		589	365		365
Pennsylvania	2,766		2,766	1,842		1,842
Delaware	60		60	67		67
Maryland	546	14	560	243	62	305
Virginia	1,121	58	1,179	1,065	214	1,279
North Carolina	597	63	660	739	241	980
South Carolina	299	18	317	282	121	403
Georgia	447	44	491	541	183	724
Florida	20	5	25	52	16	68
Alabama	225	32	257	403	134	537
Mississippi	236	36	272	193	76	269
Louisiana	132	37	169	143	104	247
Tennessee	612	28	640	732	149	881
Kentucky	590	33	623	903	155	1,058
Ohio	2,293		2,293	1,788		1,788
Indiana	1,035		1,035	907		907
Illinois	683		683	588		588
Missouri	750	20	770	447	63	510
Arkansas	82	5	87	152	24	176
Michigan	251		251	333		333
Texas	112	13	125	164	37	201
Iowa	201		201	289		289
Wisconsin	283		283	257		257
California	456		456	42		42
Minnesota	25		25	31		31
Kansas	10		10	17		17
Oregon	23		23	15		15
Total in States	23,338	406	23,744	17,210	1,579	18,789
Territories.						
Dakotah				1		1
Nebraska	5		5	3		3
New Mexico	28		28	40		40
Utah	15		15	5		5
Washington	3		3			
District of Columbia	204		204	27		27
Total in Territories	255		255	76		76
Aggregate	23,593	406	23,999	17,286	1,579	18,865

1. In the report of Dr. Nichols, of the *United States Government Hospital for the Insane*, for the fiscal year terminating with the 30th of June, 1860, it is stated that—

"The hospital was, throughout the year, uninterruptedly healthy and prosperous. The admissions, both of public and private patients, exceeded those of the previous year by nearly fifty per cent., and the ratio of recoveries to those

of the previous year was still larger. The accommodations of the hospital have not only been extended, but the personal comforts, and the occupations and amusements of the patients, increased."

	Men.	Women.	Total.
Patients on the 1st of July, 1859	84	54	138
Admitted in the course of the year	68	24	92
Whole number	152	78	230
Discharged, including deaths	46	17	63
Remaining, June 30, 1860	106	61	167
Of the discharged, there were cured	26	7	33
Died	13	5	18

Physical condition of the patients at time of death.—"Chronic organic and functional degeneration of the brain, irregular in character and extent, 6; ditto with phthisis, 2; with epilepsy, 1; with carcinoma, 1; with paralysis, 2; exhaustion of acute mania, 3; senile infirmity, 3."

"The average duration of the insanity, in the cases admitted this year, was 1.72 years, being thirteen per cent. less than that of any previous year."

Dr. Nichols thus writes upon the adaptation of hospitals to the needs of the insane:—

"Under the gentle pressure of the mild but firm discipline of a liberally appointed and faithfully conducted hospital, are alone to be found the special conditions which, while they are most conducive to the restoration of the curable, are equally calculated to smooth the path of those whose remaining years must be dark if not sorrowful. Indeed, hospital life seems as *normal*, so to speak, to the insane, as the institution of the family is to the social life of the sane. As long as death is not always, nor most commonly, the immediate alternative to recovery from insanity, institutions for the protection and comfort as well as the cure of the insane, will continue to have a large number of confirmed cases in their custody; and to those who look most ardently for the happiest event of hospital treatment, the presence of a considerable proportion of the less hopeful class of inmates should not be deemed objectionable. To many of the quiet, long-domiciled patients in a hospital, its discipline has become a passive and often an agreeable habit, and as new patients naturally imitate the ways of old ones, the influence of the latter class in promoting a ready and cheerful acquiescence on the part of new comers in common habits of order, occupation, and self-constraint, is often material and salutary."

It is doubtless generally known that this hospital, like some others of the public buildings of the general government, has been erected *piecemeal*. A section of less than one-third of the whole was completed and opened for patients before any part of the rest was begun. It is gratifying to learn from the report before us that the last portion is under roof, and "the plastering and trimming of the interior somewhat advanced," while "the centre and contiguous sections of the wings have been entirely completed, furnished, and fitted up, and are now appropriately occupied throughout."

The buildings having been brought thus nearly to completion, the opportunity presented by this report is seized for the purpose of giving a somewhat detailed description of the whole establishment. The text is illustrated by five large lithographic prints, the first of which is a topographical plan of the grounds; the second, a ground plan of the buildings; the third, a perspective view of the main edifice; and the fourth and fifth, details of construction and furniture. As this hospital is a national work, we quote at length the general description of it.

"This establishment comprises—

"1. *A tract of one hundred and ninety-five* (195) *acres of land*, situated on the southeast bank of the Anacostia River. It is nearly due south from the United States capitol, and about two miles from it in a direct line. It is the most prominent part of what has been known ever since the settlement of the country as the *St. Elizabeth* tract. Considered as the site of an institution for the insane, I think it not extravagant to say that it combines special advantages that are not probably exceeded in any other one tract in the whole world. It is perfectly healthy. The site of the hospital edifice commands a panoramic

view of the entire District, and of an equal extent of country in Virginia, including the city of Alexandria, and, incidentally, of the navigation of the Potomac, and the ordnance experiments, launches, and other conspicuous operations at the navy yard and arsenal. Who can tell how many hours, otherwise sorrowful or dull and tedious, will be more or less relieved by the varied scenery and the teeming incidents of this grand panorama, which will often steal upon the notice of those who would repel personal sympathy and attention.

"In another part of this report I have alluded to the admirable natural adaptation of considerable portions of this tract to the purpose of pleasure grounds for the insane, and need not repeat what I have there said; but may add that it comprises every variety of soil and exposure, and affords, fresh and abundant, the luxuries of the garden, the farm, and the dairy.

"When this tract of land came into the possession of the government, about one-half of it, or one hundred acres, were under cultivation. Since that time its productiveness has been increased at least fifty per cent., and about twenty acres have been reclaimed from the forest, and put under cultivation—about the same number that have been appropriated to the site of the buildings, and the grounds and yards for their immediate accommodation. It is thought that the original forest may be ultimately reduced to fifty acres, and that about forty-five acres will be appropriated to the buildings and to drives, walks, ornamental trees and shrubbery. The former will still afford a range for stock, and the latter, the supply of hay necessary in the stable-feeding. The lesser channel of the river washes the hospital shore, and bears to its own wharf, at reduced cost, its heavy supplies. It is in accessible proximity to the city, from which it is separated by a barrier to the encroachments and annoyances of a populous town. It has an unfailing spring of pure soft water, and if more water than the spring supplies should be needed for ornamental or agricultural purposes, resort can be had to the river, and various and efficient are the means for raising water to any required height. An accurate topographical survey of the grounds of the hospital is appended to this report, to which I beg to refer for a clearer comprehension of the special merits of this site.

"2. *A principal hospital edifice and two detached lodges.*—The wings of the main building and the lodges contain two hundred single chambers and thirty-two associated dormitories; fourteen drawing-rooms, twenty-four dining-rooms, twenty-two bath-rooms, twenty-eight water closets, fifty-seven clothes-rooms and closets, four sewing-rooms, two coal vaults, two servants' dining-rooms, and in immediate prospect, two bowling saloons, and one ice and preserving cellar, and will accommodate without putting more than one person in a bed, or one bed in a single chamber, or more than six beds in each of the four largest associated dormitories, or more than four in each of the remaining twenty-eight, three hundred patients—two hundred and sixty whites, and forty blacks—and thirty-six personal attendants. It will be remembered that the room required by the insane is about double that usually allotted to the sick with other than mental disorders. A general hospital of this size would receive at least five hundred patients. The number of insane that different institutions for their custody and treatment will comfortably accommodate, depends upon other circumstances than their relative size, and those circumstances are different at different times in the same institution. For example, this institution retains the custody of most of its incurables till their death, and this class will increase in actual numbers, if not in proportion to the whole number under treatment. It will include many quiet, passive persons, to whom a much closer aggregation than that contemplated in the statement of the accommodations of the hospital, already made, would be in nowise objectionable. If we suppose that this class will, in the long run, average one-third of the whole number under care, I think that the maximum accommodations of the hospital will prove, in practice, to be one-sixth greater than what may be called its *rated* capacity, and that three hundred and fifty patients will be treated very comfortably. If, on the other hand, this hospital should, like some institutions of this character, be obliged to cast off its incurables and select the most promising cases from among a surplus of pressing applicants, its proper accommodations would be one-sixth less than its rated capacity.

"The centre of the main edifice contains, above the basement, twenty-five (25) rooms, ranging in size from 21 ft. 4 in. by 16 ft. 6 in. to 20 ft. 3 in. by 19 ft. 10 in., and one chapel and lecture room 60 ft. 10 in. by 50 ft. 9 in., thirty-two closets, twenty-five, 6 ft. by 10 ft., and eight 3 ft. by 6 ft.; four water closets, each 6 ft. by 10 ft., and one bath-room of the same size; and, in the basement, two kitchens, one 43 ft. 9 in. by 19 ft. 11 in., and one 20 ft. 3 in. by 19 ft. 10 in.; one bakery, 43 ft. 9 in. by 19 ft. 11 in.; one dairy-room, 23 ft. 2 in. by 11 ft. 9 in.; and three store-rooms, two 20 ft. 3 in. by 19 ft. 10 in., and one 21 ft. 4 in. by 16 ft. 6 in.

"This building is the material centre of the establishment, as well as of its administrative authority and domestic economy. It contains the reception rooms, business offices, private rooms of the superintendent and his immediate assistants, and the kitchens and store-rooms.

"3. *The outbuildings of the hospital.*—They comprise (1), connected but distinct stable accommodations for 12 horses, 32 neat cattle, 100 swine, and 200 fowls, including lying-in, calve, tool, grain, carriage, slaughter, and feed-rooms, a root cellar, large fodder lofts, approved machinery, propelled by steam power, for cutting fodder, crushing and grinding corn in the ear, and for grinding clean grain of all descriptions, and steam kettles for cooking food for stock; and (2), in another building, an extensive laundry, one engine, one engine and pump, one boiler, one fan, one gas and one machine room, and a vault holding 500 tons of coal. The laundry occupies the whole of the second story, and has a drying yard attached to it. It is fitted up with a centrifugal wringer, a Shaker washing machine, a power mangle, a steam and fan drying room, and all the best of the modern improvements. The power engines, steam pumps, fan, boilers, and gas works, are each the best of its kind, or were certainly intended to be. The exterior and partition walls of both of these buildings are built of brick, and their entire construction is throughout substantial and durable.

"The ground plan of the main edifice has been appropriately denominated an *echelon.* It is a modification of what is known in this country as the Kirkbride or Trenton plan, and is thought to embrace peculiar advantages in respect to classification, light, and spontaneous ventilation, and in presenting the broken outline of a castle or villa. The facade of the building is called the *collegiate gothic* style, and is thought to be appropriate, and also highly effective, in view of its plainness and the cheapness of the materials in which it can be represented. Mechanically speaking, all the buildings of the establishment are believed to be as substantial and durable as, at the average high prices of materials and rates of wages in the District since they were commenced, could be built for their cost.

"Every effort has been made to make the internal finish of the house and its furniture and conveniences tasteful and homelike, and to adapt them in all the wards to the habits and wants of the insane, and in each ward to the comfort and safety of the particular class it is designed to accommodate.

"The heating of the building is by the hot-water circulation; the ventilation is by a fan or blower. The arrangements for both were devised at the hospital, and put up without the aid of a special engineer, and experience has shown that they are effective in promoting the comfort and health of the inmates of the house."

We complete our extracts from this report with the author's appropriate remarks upon the character of the institution.

"A government establishment situated in or near the capital of the republic, whether scientific or benevolent in its objects, is a *representative* institution. That character is inseparable from its conspicuous position. It also arises from the universal and just expectation that all institutions and appurtenances of the general government of a great nation will be complete, according to the knowledge and appreciation of their several objects enjoyed by the representative or ruling people of the country. If this institution is, in truth, to ever so small an extent, an exponent of American knowledge and philanthropy, its position is, in that respect, a highly responsible one. It will have some influence upon the character of the other similar institutions of the country, and that influence ought, in time, to be large and good. It will have its weight, however small, in determining the estimate our own people will form of the character and benefits of their own government, and it will also affect the judgment that the citizens

or subjects of other countries and governments, travelling or sojourning in this country, will form in respect to the character of American institutions, and the practical merits of the American form of government.

"A sense of this responsibility has been kept steadily in view, and we believe that every succeeding year has been characterized by an increasing progress in that *pursuit of perfection* which we have sought to make the cardinal and animating principle of the management of the hospital."

From observation during a recent visit to this institution, we are enabled to add our testimony to the progress mentioned, as well as to state that the buildings appear to have been erected with a constant view to convenience, permanence, good taste, and liberality of space, combined with a judicious and wise economy.

2. The report of the *Northern Ohio Lunatic Asylum* for the official year terminating with the month of October, 1861, contains the following numerical results:—

	Men.	Women.	Total.
Patients at the beginning of the year	64	71	135
Admitted in course of the year	67	64	131
Whole number	131	135	266
Discharged, including deaths	59	66	125
Remaining at the end of the year	72	69	141
Of the discharged, there were cured	31	36	67
Died	3		3

Died of apoplexy, 1; epilepsy, 1; consumption, 1.

"Hereditary predisposition existed in twenty-eight of those admitted during the year, and the suicidal propensity was evident in thirty-eight."

Our readers are aware that, in Ohio, the whole expenses of the State Benevolent Institutions are defrayed from the treasury of the commonwealth. In allusion to this fact, Dr. Kendrick says: "Not a few entertain the erroneous idea that our State institutions must necessarily be pauper establishments. On the contrary, our citizens are equally taxed for their maintenance and equally entitled to their favours. The benevolence of the people has opened wide the doors of their public charities, not to debar the intelligent, the wealthy and the refined from participation in their benefits, but on the ground of a common humanity, to place those benefits within the reach of all; and as this is a common bounty, its recipients, who are joint contributors to it, should find in it ample resources to meet the wants of all. Until this is done, our benevolent institutions will continue to fall far short of their true mission."

3. The new buildings for the Hamilton County (Ohio) Asylum have been completed, and put into operation under the title "*Long View Lunatic Asylum.*" The superintendent, Dr. O. M. Langdon, was appointed in November, 1859; the first patient was received on the 21st of February, 1860; and between the 26th of March and the 3d of May, of the latter year, 296 patients were transferred to it from the old establishment. Twenty-three patients were also removed to it from the hospital at Dayton. The report is dated October 31st, 1860, and consequently the numerical record of patients includes a period of but about eight months.

	Men.	Women.	Total.
Patients admitted	206	216	422
Discharged cured	30	19	49
" improved	7	10	17
" unimproved	6	2	8
Died	12	2	14
Remaining Oct. 31st, 1860	151	183	334

The report is chiefly occupied by a descriptive account of the establishment. The Board of Trustees, in their fixed report, say: "To the honour and credit of Hamilton County be it said, that to her beneficence we are indebted for the largest, best constructed and arranged Insane Asylum in the country;" and

Dr. Langdon asserts that "when all the improvements in the house and grounds are finished, we shall have an institution unsurpassed by any in the country for beauty of location, convenience and spaciousness of building, and general perfectness of appointment.

"The lot upon which the building stands contains thirty-eight acres. * * *

"The building is beautifully situated on a ridge, overlooking the valley of Mill Creek, above which it is elevated about one hundred feet, thus obtaining an extensive and beautiful prospect in almost every direction, not only from the house, but from the grounds around it. It is about seven miles from Cincinnati, and very easy of access. It is built of brick, is six hundred and twelve feet long, and consists of a centre building, five stories high, surmounted by a dome, and two wings, three stories high, each intersected by three cross-buildings, two of which are four stories high, one of them surmounted by a dome, smaller, however, than the one on the main building."

There are wards for pay-patients in the fourth story of the central edifice. The wings are wholly devoted to paupers.

"The iron stairways in the house are not only convenient for the passage of patients from one part of the house to another without bringing them to the public stairways, but in case of fire they furnish a ready and safe means of egress for all inmates. The wards are shut off from each other by double doors, preventing any noise in one being heard in the next. The floors are all laid in cement, which serves an excellent purpose in deadening sound, and in connection with the abundant supply of water, is almost perfect protection against fire. Each ward contains a bath-room, pantry, wash-room, and water closets, supplied with hot and cold water from faucets, with self-acting valves, to prevent waste of water by the inmates. Each contains also an elevator, drop or chute for soiled clothes, and one for dust, which reaches to the basement. The cross buildings of the wings are all, except the two at the extreme ends in which the strong rooms are located, one story higher than the rest of the wings, and the two next the main building are surmounted by domes. The upper stories of these are devoted principally to convalescents, and contain the amusement and reading rooms."

The building is lighted by gas, and ventilated through a large air duct in the cellar which opens into a chimney 125 feet in height, the common escape from the fires in the several departments of domestic labour. An adequate supply of water is furnished, through a forcing pump, from the neighbouring canal. The house contains "nearly six hundred rooms, fifty-six water closets, six thousand, one hundred and seventy-eight feet of water pipe, three hundred and fifty-six cocks, and five hundred gas burners."

4. The report for 1859 of the *Western Lunatic Asylum of Kentucky* was the last which has heretofore come to our hands. We still have none for the year 1860; but we learn, from other sources, that in the early part of December of the year last mentioned, the building of that institution was totally destroyed by a conflagration, the origin of which is to be attributed to a defective chimney. With one exception, the patients were all saved. They were furnished with temporary shelter in the public buildings and some of the private dwellings of Hopkinsville; but the principal officers, of whom Dr. Montgomery is the chief, were so much engrossed in their laudable efforts to save the patients, that their own effects were destroyed.

By the report in hand, it appears that the building is in process of reconstruction. We infer, also, that most of the patients were not returned to their former residences, but are retained in some of the halls which have been rebuilt, or in temporary receptacles.

	Men.	Women.	Total.
Patients on the 1st of January, 1861	88	73	161
Admitted in the course of eight months	8	4	12
Whole number	96	77	173
Discharged, including deaths	22	13	35
Remaining, September 1, 1861	74	64	138
Of those discharged, there were cured	14	9	23
Died	4	2	6

"The very small number of admissions," writes Dr. Montgomery, "is owing to the fact that, since the fire, our room and means of accommodation have been restricted; indeed, all the wards, particularly those for females, being constantly crowded, too much so for the comfort and even safety of the patients, especially during the hot weather of summer. Most of the few admitted had been returned to their friends immediately after the fire, with the understanding that they might be sent back if their condition should seem to require it." * * * To those "who know and can consequently appreciate the difficulties under which the institution has recently laboured, the number who have eloped (7) will not appear large. The cabins for the males cannot readily be made so secure as to prevent frequent escapes at night."

The terrible calamity of the conflagration, the death of the steward, the resignation of the matron, and the loss of most of the experienced attendants, when considered in connection with their consequences, constitute a melancholy chapter of experience for Dr. Montgomery, in the short space of one year of hospital life.

5. About seven years ago the General Assembly of Iowa made its first appropriation for the erection of a State Hospital for the Insane. After delays not unusual in enterprises of the kind, the centre and one wing of the principal building were completed, and opened with appropriate ceremonies, on the 6th of March, 1861. The hospital is at Mt. Pleasant, and is under the superintendence of Dr. R. J. Patterson, formerly of the Indiana State Hospital, and, still later, of the Asylum for Idiots in Ohio. His experience is large, and his ability unquestioned. We quote from his description of the establishment now under his care:—

"The hospital farm consists of 173 acres of fertile land, about one-half of which is sparsely timbered and beautifully diversified by hill and valley. The other half is what is termed rolling prairie.

"The building, which is of the Elizabethan style of architecture, consists of a stately central structure, and wings on either side, tastefully grouped in the quadrangular forms. The central portion is four stories high, and all other parts three stories high above basements. The walls are all of solid cut stone masonry, lined on the inner side with brick. The roof covering is of heavy galvanized iron.

"In the central building, which is 90 by 60 feet, and four stories high, are the public offices of the Superintendent and his assistants, the Steward's and the private rooms of all resident officers. It has also a rotunda 49 by 57 feet, in which is a splendid double stairway reaching to the top. It is surmounted by a beautiful tower, the top of which is 137 feet from the ground. The six wings, three on either side, are for the special use of patients, and are each respectively, 114, 151, and 131 feet in length by 40 feet in width, all three stories high above the basements. They are agreeably diversified by bay windows, projections, and recesses, and give an entire front of 512 feet. Two cupolas rise 90 feet from the ground over these wings, and serve a practical use as ventilators as well as ornaments. At the extreme end of these wings are return-wings, each 131 feet deep by 40 feet wide, giving the structure its quadrangular form. Also, there is one central wing, extending from the rear of the central building, 115 feet deep, three stories high, in the basement and first stories of which are the kitchen, bakery, dining-rooms, store-rooms, and other domestic offices. In the second and third stories is a beautiful chapel 38 by 50 feet, with 20 feet ceiling, in the rear of which are numerous lodging-rooms for domestics.

"In the whole establishment there are 425 rooms, great and small, exclusive of basement rooms. It contains 1,100 windows and 900 doors. A walk around the outside walls is a half mile, and a walk all over its halls about one mile in length. It required 120,000 square feet of galvanized iron sheeting to cover the roof. In the basement is a railroad one-eighth of a mile in length, with iron rail, upon which a hand car carries the food from the central kitchen to dumb-waiters beneath all dining-rooms. The buildings are designed for the liberal accommodation of at least 300 patients, with all needed officers, attendants, and assistants to take care of them.

"The entire establishment is warmed by steam, and all machinery for elevating water, for forced ventilation, for washing and wringing clothes, is driven by steam power. Steam is also liberally used for heating water for baths, and for cooking. Galvanized iron pipes carry hot and cold water to every part. There are 70,000 feet, or about 12 miles, of iron pipe connected with warming, lighting, and the distribution of water. Iron tanks, whose aggregate capacity is 14,000 gallons, have been placed in the central attic, and a brick cistern, cylindrical in form, whose capacity is 3,000 barrels, has been placed under ground.

"A rotary fan, fifteen feet in diameter, with eight feet span, driven by steam power, secures a forced ventilation. The wash-house and laundry are furnished with a large David Parker washing-machine, a rotary patent wringer, and a mangle, all propelled by steam. The buildings were completely piped throughout for gas before plastering the walls, and a gas-house will be erected and gas lights introduced during the next year, from an unexpended appropriation for that purpose.

"Having examined nearly all of the best hospitals in the United States, and having experienced more than ten years of hospital life, I am enabled to speak with much assurance in regard to the excellence of our buildings and fixtures. They are doubtless the most permanently built in every part and among the most extensive of any in the country. They seem to have been erected for all time. No one portion has been slighted, but everywhere are abundant evidences of enlightened economy and skill, faithfully applied.

"The furniture is in keeping with the building. The language of the Iowa State Medical Society, who visited the hospital, declares, '*everything excellent—nothing superfluous.*'"

The report bears the date of December 1, 1861, and hence covers a period of a few days less than nine months.

	Men.	Women.	Total.
Patients admitted	91	79	170
Discharged, including deaths	17	13	30
Remaining, November 30, 1861	75	65	140
Of those discharged, there were cured	8	11	19
Died	4	2	6

Causes of death.—Exhaustion from chronic mania, 5; consumption, softening of the brain, typhoid fever, and congestion of the brain, 1 each.

It is a noteworthy fact, that of the 170 patients 70 were between the ages of 20 and 30 years, and only 43 between those of 30 and 40; the number in the former decade being nearly twice as large as that in the latter. The proportion is larger than at the institutions among the older populations of the more early settled States.

The subjoined extract, coming as it does from authority based upon extensive observation among both idiots and the insane, is of no small importance.

"Although the period of childhood furnishes, comparatively, few cases of insanity, I am led to believe, from an examination of the history and condition of inmates of idiot asylums, that insanity is more common among children than has generally been supposed. Many of those inmates show, or have shown, signs of insanity rather than idiocy. In many cases the insanity in these young subjects has been overlooked, and becoming chronic and assuming the form of dementia, these persons have been regarded as idiots, and have been very properly placed in an appropriate institution for their improvement.

"The cases of insanity in children that have come under my notice have occurred, as in adults, more frequently among those who have inherited a predisposition to mental unsoundness, or who possess highly nervous temperaments, and are exposed to circumstances favouring the development of mental disease. Though not of a low grade of intelligence, they have marked peculiarities, are very nervous, highly excitable, subject to uncontrollable fits of passion, have strange caprices, and submit but poorly to established rules."

Although the battle against the lancet has dwindled into a mere guerilla warfare, and most of the bleeders have become seceders, we consider it important that the last petty enemy should be chased and conquered, and consequently

give a place to Dr. Patterson's, wherein he may exercise his generalship in the cause.

"Bleeding, at the present day, is scarcely resorted to, even in private practice, and much less in public institutions, where the physical *status* in almost all cases, when admitted, is found to be greatly *below par*. No combination of symptoms in any case thus far admitted, could have justified us in resorting to bloodletting. Raving mania can be more permanently controlled by the use of the warm bath, cooling applications to the head, warm foot-baths, mild cathartics and anodynes, and, in certain cases, by stimulants. Bleeding may quiet a paroxysm of mania temporarily, but the excitement is apt to return with greater fury, while the system is less able to bear it than before. Bleeding, therefore, does not accomplish the desired object, but, on the contrary, it impoverishes the blood, and reduces the strength, without diminishing permanently the nervous excitement. A few cases only seem to have suffered from too free depletion before admission to this institution, and these have required the protracted use of tonics and good diet to repair the evil. The use of blisters, setons, and moxas, together with drastic purging and emetic tartar, may go with bleeding. All these are obsolete, in this latitude and climate."

6. Dr. Clement, in his report of the *Wisconsin State Hospital for the Insane*, occupies but three pages, confining himself to such subjects alone as he "deems to be of interest to the guardians of the institution, and to the people of the State, its willing and able supporters."

The hospital was opened on the 14th of July, 1860; the first subsequent report, which was noticed in our issue for July last, was dated December 16, 1860; and the second report, now before us, bears the date of October 1, 1861. The whole period since the opening being but 14½ months, the numerical record from the beginning is included in the following statistics:—

	Men.	Women.	Total.
Patients admitted	72	73	145
Discharged	21	21	42
Remaining	51	52	103
Of those discharged, there were cured . .			16
Died			11

Causes of death.—Phthisis, 3; softening of the brain, 2; maniacal exhaustion, 2; exhaustion from puerperal mania, general paralysis, epilepsy, and dysentery, 1 each.

"The case of dysentery was an isolated one. There has been no prevailing sickness in our household. The general health of our patients could not have been better. Our location is apparently very healthy, our ventilation is as perfect as has ever been attained, we have furnished an abundance of nourishing food, and have given constant and untiring attention to the cleanliness, exercise and diversion of those under our charge. We have therefore expected, and should have been sadly disappointed not to realize such results."

"Our patients have enjoyed a remarkable amount of out-door exercise during the past summer. Many have willingly aided in clearing up the grounds, working the farm, the vegetable and flower gardens, and performing any desired labour. Others have enjoyed fishing upon the lakes, thus obtaining not only a very pleasant and healthy kind of exercise, but also an agreeable variety of food for their tables. We have also a large and very safe sail-boat, which has proved to be one of the most useful things connected with the institution, affording a rare and very pleasing variety of exercise and entertainment. It will never be used by the patients, except under circumstances that insure positive safety. We have a flower garden in front of the building, that seems almost the result of a miracle, considering the short time in which it has been produced. Bouquets from this are constantly on the tables throughout the house, and the more quiet female patients are frequently allowed to walk in it and pick flowers for themselves.

"During the past winter we had frequent dancing entertainments and social

gatherings. Religious services are held in the chapel during the Sabbath, which are gladly attended by about one-half of the patients, who conduct themselves in an orderly and quiet manner. We have a hired billiard table, which is in almost constant use during the cold season. We very much need a library. These means of entertainment and exercise are not mere luxuries, but actual necessities, of which the State cannot afford to allow the institution to be destitute."

Another section of the hospital is in course of construction.

7. The report for the fiscal year 1860–61, by Dr. Bancroft, of the *New Hampshire Asylum for the Insane*, is unwontedly short, and its contents limited almost exclusively to statistics and the material improvements of the year.

	Men.	Women.	Total.
Patients on the 1st of May, 1860	95	89	184
Admitted in course of the year	48	58	106
Whole number	143	147	290
Discharged, including deaths	55	39	94
Remaining May 1, 1861	88	108	196
Of the discharged, there were cured	19	15	34
Died	12	4	16

Although at some former period we have mentioned the disposition to compare the statistics of the institutions for the insane, irrespective of the many conditions and circumstances by which they are modified, we think it proper again to recur to the subject. The results of a comparison so made are detrimental to some institutions, too favourable to others, and unjust to all.

The New Hampshire Hospital has been in operation nineteen years, and hence it might be expected that a very large *percentage* of the admissions would be of cases of short duration, and consequently susceptible of restoration; but the subjoined extract shows that such result has not yet been reached.

"Of all admitted during the last year only fifty-six were recent attacks of insanity, while fifty, or nearly one-half, were persons in whom the disease had existed for longer or shorter periods; in most more than one year, and in many several years; and nearly all of the latter class had passed the period which affords much hope of recovery."

With such material to work upon, it is unreasonable to suppose that the proportion of cases can be large.

The next extract shows that with but little acute disease in the hospital, a combination of circumstances, from some of which many institutions are exempt, may swell to a remarkable extent the proportion of fatal cases.

"Of the sixteen deaths, six were aged persons who had long been in the house, worn out at last by chronic insanity. Two were old residents in the house, one dying of apoplexy, and the other of paralysis. Another, a resident of many years, died of consumption. The others were here but short periods. One, a man over eighty, broken by intemperance, in a state of senile dementia, died in twenty days after admission. A woman, brought in a state of extreme prostration from ill-health and wounds received in attempts at suicide, died exhausted on the fourteenth day. Another aged lady, who was brought in the last stage of senile dementia, died on the tenth day. The four remaining ones—who died of maniacal exhaustion—lived severally, nineteen, eleven, ten, and five days after admission."

It gives us pleasure to exhibit, in the words of the report, the progressive efforts in the modern system of moral treatment.

"The desirableness of increased facilities for the occupation and amusement of patients has been steadily kept in view, and additions made as fast as the means at command would allow. A magic lantern with coloured views has been procured, and was used during last winter. Even from the small number of representations we were able to exhibit, the patients have derived much pleasure. A new and commodious bowling room has been built for the female patients, which will furnish them much healthful exercise as well as amusement."

A large addition to the central edifice of the hospital was erected in the course of the year.

8. Although Massachusetts has three large State hospitals for the insane, it appears that there is need of still another. Dr. Choate, of the hospital at Taunton, says, in his report for the fiscal year 1859–60, that the establishment under his care was intended for the care and cure of two hundred and fifty patients, and the space allotted was such as was considered by the best authorities necessary for the comfort and well-being and improvement of that number: yet the actual number accommodated has gradually progressed beyond that limit until, in July, 1860, it reached 392. He then advises that the number be limited to 400.

	Men.	Women.	Total.
Patients on the 30th Sept., 1859	165	176	341
Admitted in course of the year	130	115	245
Whole number	295	291	586
Discharged, including deaths	105	120	225
Remaining Sept. 30th, 1860	190	171	361
Of those discharged, there were cured . .	54	47	101
Died	25	22	47

Died from phthisis, 17; maniacal exhaustion, 7; softening of the brain (paralysie générale), 5; chronic mania, 4; paralysis, 3; apoplexy, 2; marasmus, 2; diarrhœa, 2; fever, 1; anæmia, 1; erysipelas, 1; suicide, 1; hæmoptysis, 1.

In this report the term "maniacal exhaustion" is limited to recent cases. "This is," writes Dr. Choate, "the ordinary termination of such acute cases as result fatally. Intense and long-continued excitement, inordinate and unhealthy exaltation of the feelings and sentiments, constant agitation of mind and body, and the continued sleeplessness, which are attendant upon acute mania, must inevitably, by one of the plainest laws of nature, be followed by corresponding depression and exhaustion. This, in ordinary cases, is not so severe as to endanger life, but is the gate through which the patient passes to convalescence or to dementia. But occasionally, when the excitement is high and prolonged, and the vital powers weak, the reaction is so complete and extreme, that the patient never rallies from it, but sinks rapidly till death closes his sufferings."

"More than thirty per cent. of the deaths since the opening of the institution have been from phthisis. This is probably by no means in consequence of persons with a scrofulous diathesis being more liable than others to mental disease, but arises from the fact that the development of scrofulous diseases, of which phthisis is one form, is favoured by any cause which lowers the general system and weakens its tone."

The following extracts are from the remarks upon the causes of insanity:—

"In reviewing the table of causes, one cannot help being struck with the large proportion of cases which are self-induced. And the consideration of this class will be especially useful if it should lead any to the avoidance of practices and habits which are pregnant with danger. Four hundred and twenty-one out of eleven hundred and ninety-five cases in which the cause was known, were produced by acts and habits over which the individual has full control. But these are only the acknowledged cases of unfortunate habits, only those where they are so obvious and excessive, that they are freely confessed either by the individuals or their friends. In how many more the true cause is concealed, from shame and dread of disgrace, every student of human nature can judge for himself."

"In its threefold operation upon the physical system, upon the intellectual functions, and upon the moral sense, it may well be questioned whether habitual stimulation, directly and indirectly, is not the source of more mental disease than all other causes of insanity combined. Acting upon the body, it is the immediate cause of many cases of mania and dementia, of nearly all the instances of softening of the brain, of epilepsy, paralysis, and diseases of the digestive organs, which, in their turn, react upon and overthrow the mind. Acting upon the mind, its tendency is to weaken the reasoning faculties, and undermine the judgment, inducing unwise business transactions, unfortunate social connections,

loss of property, and the mental disorders which these occasion. Acting upon the heart, it perverts the moral sense, and weakens the powers of resistance to temptation, leading to domestic unhappiness, ill-treatment of friends, and indulgence in other fatal habits, and these, in turn, contribute their share to the numbers of the insane."

In regard to the character or form of mental disorder, it is said:—

"The prevailing popular idea, that many persons are insane only upon one subject, though apparently correct, is unquestionably fallacious. The prominence of a single delusion or of false ideas upon one class of subjects, should prompt us only to a deeper investigation, which will almost invariably disclose to us a general impairment of the intellectual faculties."

As an illustration of the correctness of this view, the following case is mentioned:—

"A young lady of more than ordinary native intelligence and of considerable cultivation, is firmly possessed of the idea that her hip is dislocated, and that she is helpless. So prominent and urgent is this delusion, that at first sight one would be inclined to place the case in the class of monomania, but further examination discloses other not less curious but more latent delusions."

We close our notice of this report by the following extract:—

"A single remarkable case occurring during the year is worthy of special mention. It is one of complete recovery after eighteen years of disease. Such cases are mentioned by some of the French writers, but they are alluded to merely as remarkable and exceptional cases, and are seldom seen or recorded even in hospital reports, which cover annually such an immense number of instances of disease. The case was one of periodical mania, of excitement alternating with depression, not differing materially from many of the same class, which are at all times inmates of the hospital. The patient has now been perfectly well for ten months, and occasionally writes to her friends whom she has left here. It should lead us to look with some degree of hope upon many cases which have long been given up even by their friends."

9. In his report for the official year 1859–60, Dr. Prince, of the *Massachusetts State Lunatic Hospital*, at Northampton, in reference to the character of his patients, says: "Our numbers have largely increased, and the records show that a large proportion of this increase is composed of State paupers, a little less than fifty per cent. of the admissions being from this class. As they are mostly incurable cases, and of a character that prevents the possibility of their being cared for in an institution of a different character, they will be permanent residents, and as the increase goes on, the institution will partake more and more of the character of a retreat for incurables."

	Men.	Women.	Total.
Patients on the 30th of September, 1859 . . .	98	135	233
Admitted in course of the year	73	94	167
Whole number	171	229	400
Discharged, including deaths	34	51	85
Remaining September 30, 1860	137	178	315
Of those discharged, there were cured . .			33
Died	8	19	27

Died from maniacal exhaustion, 14; phthisis, 8; apoplexy, meningitis, peritonitis, suicide, and injury from a fall, 1 each. The term "maniacal exhaustion," as here used, undoubtedly includes, not only those cases of recent insanity, the violence or severity of which soon carry off the patient, but those old cases of gradual vital waste, the mortality of most of which was formerly attributed to "marasmus" and "inanition."

Of the patients received in the course of the year, 57 were removed from the other two State hospitals, at Worcester and Taunton.

"There are now in the hospital one hundred and seventy-eight female patients, and the part of the building allotted to them is filled, and in some parts rather crowded. Yet the ample and well ventilated dormitories and corridors prevent the usual bad effects of a crowd, and a remarkable degree of health is always enjoyed. The disproportion between the number of males and of females exist-

ing from the opening of the institution has constantly increased, and the excess in the number of females now reaches forty-one."

"By the kindness of friends in the adjoining village, we have been furnished with a great number of very pleasant musical entertainments; and these, together with a regular singing school through the winter season, and with exhibitions of various kinds, tableaux and theatrical performances by the patients and their attendants, have afforded abundant innocent amusement, and pleasantly occupied many of the long winter evenings. Riding and walking, coasting and skating, and various games, amuse and interest those capable of joining in them. Once in three or four weeks a dancing party, in which both sexes are allowed to join, affords a favorite recreation, more popular, perhaps, than any form of amusement in use.

"The library has been somewhat increased, both by purchase of books and by donations from benevolent individuals; and, although much smaller than our actual necessities demand, affords much instruction and amusement."

Dr. Prince discusses no medical question, illustrates no special medical subject in his report, but confines himself mostly to a narrative of the proceedings of the year, and an exposition of the hospital's greatest defect—the liability to temporary deprivation of its supply of water. It is to be hoped that this defect will soon be remedied. The establishment, as a whole, is excellent; and we take pleasure in here bearing testimony, after personal observation, to the beauty of its situation, its general completeness, and the ability of its management.

Among the improvements of the year is a barn 104 feet in length and 54 in width. P. E.

ART. XI.—*A Practical Treatise on the Diseases of the Heart and Great Vessels, including the Principles of Physical Diagnosis.* By WALTER HAYLE WALSHE, M. D., &c. A new American from the third and much enlarged London edition. Philadelphia: Blanchard and Lea, 1862. 8vo. pp. 420.

IT is interesting to compare the first edition of this treatise with the one just published. The former is little more than the embryo, the latter the mature and almost completed work. At first one small volume sufficed to contain all that Dr. Walshe had to communicate respecting physical diagnosis in its application to the lungs, heart, and great vessels. But that volume evidently presented the results of the author's personal observation and reasoning; it everywhere gave signs of a vigorous and original life, destined to a much more perfect expression. Even its sententious and sometimes uncouthly concise style, revealed a latent power struggling towards complete development by the slow but steadily progressive accretion of new materials and the assumption of a more perfect scientific form.

The second edition, published in 1854, and still embracing the whole of thoracic pathology, assumed an imposing bulk, and gave evidence on every page that the doctrines of the author were growing wider and more definite, and that however modest he might be in speculating where others did not hesitate to dogmatize, he, nevertheless, felt himself competent to speak as one having authority. During the eight years that have since elapsed, the work of Dr. Walshe having reached its maturity, by a fissiparous generation each half has established an independent life, and two separate volumes, each of them nearly as large as the preceding one, now contain the latest and fullest conclusions of the author respecting diseases of the lungs and of the heart.

Of the one before us it would be difficult to furnish such an account as would convey an accurate idea, especially to the American reader who has not had access to the second English edition, which was not republished here. Indeed, we cannot but think that improvement in the diagnosis of cardiac diseases has been notably retarded in this country by this omission. Those who have not had access to this, or some equivalent source of information, will be surprised to find how great a degree of certainty now attends diagnosis of the several forms of organic and functional disease of the heart and great vessels, of the affections

of the two sides of the heart, and those of its several valves and orifices. They will at the same time be struck with the number of circumstances which render caution necessary in the formation of diagnostic opinions, and thus recognize the extreme difficulty which, for all but thorough experts, environs many cases in cardiac pathology, and which sometimes renders their analysis impossible by trained physicians of the acutest senses and the maturest judgment.

It would be impossible for us to enumerate all the instances in which the present edition excels the preceding one, for there is scarcely a chapter in it which has not been enlarged by important additions, or materially modified in its statements, while in several entirely new subjects are discussed. The following may be particularly referred to, as embodying a large amount of new matter: "The Weight and Measurements of the Heart;" "The Theory of the First Sound;" "Dynamic Intra-cardiac Murmurs;" "The Impulse of the Heart;" "Influence of Stethoscopic Pressure upon Murmurs;" "Auto-audible Murmurs;" "Perverted Innervation of the Heart;" "Cardiac Motor Paralysis;" "Syncope;" "Angina Pectoris;" "Anæmia and Congestion of the Heart;" "Acute Pericarditis;" "Alterations of Secretion in the Pericardium;" "Atrophy and Hypertrophy;" "Cardiac Flux;" "Fatty Heart;" "Cancer of the Heart;" "Prognosis, &c., of Diseases of the Valves;" "Malpositions of the Heart;" "Intra-cardiac Blood-concretions;" "Cyanosis;" "Inflammation, &c., of the Pulmonary Artery;" "Aneurism;" "Cancer, &c., of the Pulmonary Artery and Veins."

In elucidating these subjects the same precision of statement and compression of matter which distinguished the former editions are to be observed: indeed, the author appears to have studied with singular care, and to have illustrated with remarkable success, the difficult art of condensation. Whoever seeks for easy reading will not find it here. On the contrary, the work demands the closest attention thoroughly to comprehend it. And yet so far from being chargeable with obscurity, its language is everywhere accurate and expressive, and whoever takes pains to study it, will be convinced that it would have been difficult to compress more truth in fewer words. If it sometimes substitutes the short and familiar phrases of clinical teaching, for the more polished locution of literary adepts, it is generally because the latter style is too poor in appropriate words to depict the subject accurately.

With this passing notice, we commend the work to our readers as, perhaps, the most valuable in the literature of cardiac pathology. Upon it, and its associated treatise, *On Diseases of the Lungs*, we think that Dr. Walshe may fairly rest his claim to stand in the first rank of his profession. A. S.

ART. XII.—*The Health of the Royal Navy considered, in a Letter addressed to the Rt. Hon. Sir John S. Packington, Bart. G. C. B., M. P.* By GAVIN MILROY, M. D., F.R.C.P., Medical Inspector under the General Board of Health from 1849 to 1854, Medical Commissioner to Jamaica in 1851, and a member of the Sanitary Commission of the Army in the East, in 1855–56. 8vo. pp. 70. London, 1862.

IT is very evident that the strength and efficiency of an armed force, whether afloat or on shore, is to be measured, not by the number of names inscribed upon the ship or regimental roll, however complete may be the material equipments of the force, but rather by the actual number of hearty, vigorous men, at any moment available for whatever duty they may be called upon to perform. Every man whose name is upon the doctor's list is so much power withdrawn from the effectiveness of the living machine. Not only is the force directly weakened by the loss of such of its number as are excluded from duty by disease, but, indirectly by the extra labour cast upon the well men to supply the loss of those who are disabled by sickness, and of those also necessarily occupied in attendance upon the latter. When disease prevails to any extent among a ship's crew, the energies of the well are overtaxed, their hours for eating and sleep are inter-

fered with; constant extra duty and fatigue create lassitude and discontent, and the very state of system in which health is most liable to suffer from morbific influences it had hitherto resisted. The means adapted to preserve, as far as is possible, uninterrupted health among a ship's crew cannot, therefore, be overestimated. They are, in fact, to be ranked among the main objects to be aimed at by all whose duty it is to look to the welfare of our navy, and to the maintenance of its efficiency for the support and vindication of the rights, the integrity, and the interests of our country.

The letter of Dr. Gavin Milroy, although confined to a rapid but most interesting review of the health of the English navy, and of the causes by which this is impaired, will be found to be replete with many important general facts and conclusions, the hygienic teachings of which are equally applicable to the navy of the United States, and have an especial interest at the present moment.

In considering the ordinary rate of sickness in the English navy, Dr. Milroy confines himself chiefly to the years 1856, '57, and '58; the statistics collected during this period furnishing the necessary facts and data to an extent and in a form much more full, and satisfactory than those of any former period.

It is to be remembered that the year 1856 was very nearly one of peace. The fleet was engaged during it in no hostile operations, either in the Black or Baltic Seas. It was not until the very close of the year that hostilities commenced in the Canton River. In 1857 the differences with China required a large increase in the naval force on that station. Most of the ships were long anchored in the Canton River, and their crews much exposed to the malarial influence of its shores, besides their frequent sharp encounters with the enemy. This year, also, the great Sepoy revolt took place, and a detachment from two of the frigates joined the military force before Lucknow. In 1858, the East India and China squadron was still further increased, and was actively engaged throughout the whole year against both the Chinese and the Indian mutineers. Three battalions of marines were for several months quartered in and around Canton, and had most severe and harassing duties to perform in that unhealthy climate.

"In 1856, when the aggregate mean force of the navy was 51,730, the average number of men daily on the sick list throughout the service was 3,132, or in the proportion of 62 men in every 1,000; in other words, a seventeenth part of the whole force was continually off duty from the effects of sickness or injury, either on board ship or in hospitals on shore. In 1857, the daily sick rate was very nearly the same, being only a fraction less. The aggregate force that year was 42,470. In 1858 the rate was higher, being in the proportion of 66 sick men in every 1,000. The number at all times ineffective, out of a total force of 43,120, averaged 2,859, or about *one* in every *fifteen* men."

The sick rate, as might be expected, varies considerably in the different fleets into which the navy is distributed, according to the stations where they are employed. The amount of sickness being, usually, lower in the Home, the Mediterranean, the Pacific, and the Australian stations than in the other fleets. But, in fact, the rates vary so much in nearly all of them, from year to year, that no very positive or uniform statement can be made on this head. Only two of the fleets exhibit uniformly a high rate of sickness—that on the west coast of Africa, and, still more so, that on the East India and China station. The irregular force also generally exhibits an unfavourable return.

The following table shows the mean strength of the different fleets, with the average sick-rate of each for the three years 1856, '57, and 58:—

	Mean strength.	Average daily sick-rate.
East India and China fleet	7,263	93 per 1,000 men.
Irregular fleet	7,117	69 " "
West coast of Africa fleet	1,707	68 " "
Cape of Good Hope fleet	1,030	59 " "
North America and West Indies fleet .	4,365	58 " "
East coast of South America fleet .	1,323	55 " "
Pacific fleet	2,387	53 " "
Mediterranean fleet	7,867	52 " "
Home fleet	11,814	50 " "
Australian fleet	437	46 " "

The number of days in the course of the year spent upon the sick list was, in 1856, throughout the navy, such as to give 22 days off duty to each man employed; in 1857 the proportion was a trifle more; and in 1858 it was rather more than 24 days off duty to each man.

The rate of mortality in the navy varies much in different years, not only on separate stations, but throughout the service generally—and this, too, independently of the casualties of war and of all other accidents to which seamen are exposed.

In 1856 the general death-rate from all causes was 15.5 in every 1,000 men; while the deaths from disease alone throughout the service were in the proportion of 12.1 in every 1,000 of the force. In 1857 the proportion of deaths from all causes was 22, and from sickness alone 14.7, per thousand. In 1858 the general deaths from all causes was 25.8, and from sickness alone 20.2, per thousand. The general average of deaths from disease for the three years was, therefore, between 15 and 16 per thousand.

The mean death-rate for the three years was—

	From disease alone.	From all causes.
On the Home station	7.8	10.3
" Mediterranean station	8.4	11.6
" North American and West India	19.8	24.0
" Brazilian	21.0	25.2
" Pacific	6.9	8.7
" West African	14.3	20.5
" Cape of Good Hope	10.2	16.3
" East India and China	37.7	47.6
" Australian	3.6	9.9
" Irregular	8.3	12.4

In respect to the high death-rate of the East Indian fleet, we are reminded by Dr. Milroy, that 1857 and 1858 were years of war, both in China and the East Indies. During 1856 the death-rate was only 27 per 1,000 from disease, and 34 from all causes; while in 1858 it was 51.9 from disease, and 62.5 from all causes.

Another cause of permanent loss to the service, from year to year, is the discharge of all the men who are absolutely unfit for future duty in consequence of grave organic disease, or of some incurable infirmity.

"In civil life," remarks Dr. Milroy, "the annual death-rate is our only available test in estimating the heathfulness or unhealthfulness of the community. No means, as yet, exist for ascertaining, as in our army and navy, the statistics of sickness among the population of our towns and rural districts. As to any elimination of invalids among civilians, the only discharge of them is by death. This circumstance alone presents a marked difference in the elements of any comparison instituted between the ratio of mortality in naval and military life on the one hand, and among working men of the same ages in civil life, on the other; greatly, of course, to the advantage of the former by so many incurable sailors and soldiers having been discharged, and whose deaths on shore go to swell the mortuary returns of the latter. What addition should be made to the death-rate from disease in the navy to bring it more upon a par with the death-rates in civil life, for the purpose of comparison, it is not easy to determine. It cannot be less, I should think, than six or seven per thousand of the strength at the least.

"In 1856 the number of men invalided was 998, or in the proportion of rather more than 19 in every 1,000 of strength. In 1857 the number invalided was 1,460, or rather more than 34 per thousand; and in 1858 the number was 1,763, or nearly 50 per thousand. The mean rate for the three years together, in the entire navy, was therefore between 31 and 32 in every 1,000 men. To show how much this varied in different fleets, it may be stated that on the Home station it was 23, while on the East India station in was 52 per thousand.

"By putting together the number of deaths, and the number of men discharged as invalids, in the course of the twelve months, the yearly total permanent loss to the service is ascertained. In 1856 this amounted to 1,799 men, out of an

aggregate strength of 51,730. In 1857 it amounted to 2,404, out of an aggregate of 42,470; and in 1858, out of an aggregate of 43,128, it amounted to 2,878, or a loss equal to the combined crews of three of the largest line-of-battle ships in the navy.

"To put the facts in another way, the proportion of total permanent loss to strength in 1856 was, throughout the navy, 34.8 per thousand men; in 1857 it was 53.8 per thousand; and in 1858 it rose to 66.7, or a full *fifteenth* part of the whole strength. If we take one or two fleets by themselves, we find that, on the Home station, the mean rate for the three years of the total permanent loss was 33 per thousand, or, deducting all the losses attributable to violence and accident, that it was at least 28 or 29 per 1,000 of the strength. In the East India fleet, the mean total loss for the trienniad was at the rate of 95.9 per thousand, or little short of 10 per cent. of the force per annum.

"There is often observed a marked difference in respect to the healthiness of different ships of the same squadron. While some are particularly sickly, others, similarly employed, and exposed, apparently, to the same external or atmospheric influences, are comparatively healthy. The greater sickliness of some ships over others may be for one season or year only, or for a succession of two or three years. Occasionally a ship has been so uniformly unhealthy, whenever it has been put in commission, as to acquire a thoroughly bad name in the service.

"The cause or causes of this difference in the salubrity of different vessels in the same fleet is not in every case very apparent. In sanitary investigations we are often led astray by our attention, under the influence of some favourite hypothesis, being confined to one set only of agencies, while the action of others equally morbific in their influence are underrated, or entirely overlooked. This is the case in respect both to dwellings on land and vessels at sea.

"A house may, to the outward eye, be a picture of neatness and beauty; it may be as trim and clean as hands can make it; it may have been well constructed, with drains and sewers, which are carefully looked after to prevent all obstruction, its sitting rooms may be well aired and as fresh and sweet throughout the day as can be desired, and yet in such a dwelling some of the inmates, whose health previously had been good, are constantly ailing—with headache, loss of appetite, and general malaise and debility, if not with bowel and febrile complaints. And all this may be owing to some overlooked and unknown old cesspit under or close to the basement, or to the foundation being damp and unaired, or to a stagnant pond or manure heap close by; or it may be that the doors, windows, and heat registers of the bedrooms are so closely fitted, that not a breath of air can pass into or out of the rooms at night; or that too many persons may sleep in one small chamber—which also may be on an ill-ventilated basement floor, or over a stable or an outhouse, where dust and refuse matter are allowed to accumulate. Or, with none of these evils, the water supply may have acquired some taint or impregnation, which slowly but surely affects the health."

The same is true in respect to a ship. She may be damp, deficient in ventilation, or overcrowded, or she may be stationed in the neighbourhood of unhealthy localities—the low, marshy shores of sluggish rivers, from whence, under the influence of a hot moist atmosphere, an accumulation of decomposing organic matter is continually exhaling morbific miasmata. Or, again, there may be malarial exhalations from impurities in the hold—from putrid bilge matter, slowly decomposing vegetable matter, or the decay of a portion of her own timbers.

According to Dr. Milroy, the diseases which occasion by far the greatest amount of mortality in the English navy are fevers, diseases of the bowels, and affections of the lungs.

Fevers vary much in frequency and fatality in different years at all the naval stations. The ships most exempt from their influence are those on the home station. The annual number of deaths from fever among the crews does not average more than eight or nine. Very many of the attacks result from intemperance and exposure to wet and cold, when the men get liberty to go on shore. Occasionally, however, the fevers are of a decidedly typhoid or typhus character.

The estuary of the Medway is set down as the chief fever locality on the Home station. The cases are generally of a periodic character; occasionally they are attended with severe gastric and bilious symptoms, when, usually, they are of a more typhoid type.

Fevers are generally three or four times as frequent and fatal in the Mediterranean as in the Home fleet. The majority of cases are of a mild continued or remittent type; about one-fifth are intermittent. The annual average frequency of fever attacks on this station appears to be about 70 in every 1,000 men. The annual death-rate from fever has averaged about two in the thousand.

It is on the West India station that the greatest amount of fatal fever cases has of late years occurred in the English fleet. Fully one-half of all the deaths from fever throughout the service, in the years 1856, '57, and '58, were caused by yellow fever. Dr. Milroy remarks that this disease has been more fatal on board the English ships of war during the last fifteen or twenty years than was ever known previously, and all the vessels which have been smitten most severely have been steamers.

"That the excessive heat on board, without adequate free ventilation, has had much to do with the increased malignancy of the disease, is, Dr. M. thinks, more than probable. It would seem, too, that the accumulation of dirt and other offensive rubbish under the machinery, etc., has in several instances added not a little to the impurity of the close hot air in the between decks. On some occasions particular parts of a smitten ship appear to have been the especial focus of the poisonous action." And this in nearly every instance has been traced to some evident source of malaria existing in the infected quarter.

"The prompt abatement, and often the complete cessation of the disease when the crew of an infected vessel have been moved out of her into clean, airy quarters on shore or afloat, afford," Dr. M. remarks, "conclusive evidence how much the ship herself is apt to be the chief cause of its malignancy and persistence."

An important inference deducible from this fact is, that, by the simple expedient of securing a free circulation of pure air at all times, but more especially from sundown to sunrise, to every one without exception on board a sickly ship, the virulence and extension of the disease would be greatly controlled. Whenever, we are told, the sick have been treated in tents or under an awning on the upper deck, instead of in the usual sick bay, and the between decks has been kept fully ventilated, salutary effects have been always obtained.

The fleet on the east coast of South America sustained, also, serious losses from yellow fever in 1856, '57, and '58, as well as in some former years. The Brazilian station, formerly exempt from all malignant fevers, and considered even more healthy than the Home station, has, within the last ten or twelve years, become particularly destructive to the health of the seamen in consequence of the prevalence there of the yellow fever which made its first appearance in 1849–50.

On the Pacific, Cape of Good Hope, and Australian stations fevers are represented as being comparatively rare and mild. In the West African squadron, a great reduction of the mortality from fevers has taken place for many years past. The annual death rate from fever has not exceeded during the three years, 1856, '57, '58, five per thousand of the strength. This reduction is referred, in part, to the absence from the African coast of the malignant form of yellow fever, and partly, also, to the salutary changes in the mode of conducting the duties of the station which have been introduced upon the recommendation of the medical department of the service.

The eruptive fevers are comparatively rare among seamen. The only one of the exanthems which demands attention, in reference to the navy, is smallpox. Of this disease, there occurred in the Black Sea fleet, during 1854 and 1855, 81 cases, of which five proved fatal, and in the Baltic fleet, 303, of which 18 were fatal. In the majority of instances, the disease seems to have been caught before the ship sailed from England.

In 1856 the whole number of cases of smallpox throughout the entire service was thirty-nine. They occurred chiefly in the Home and Mediterranean fleets. Three of them were fatal. In 1857 the number of cases in the service was twenty, ten on the Home, and six on the East India station; neither fatal. In

1858 the number of cases was 83; 47 on the Home, and 31 on the East India station; ten proved fatal.

Bowel complaints, chiefly alvine fluxes and cholera, cause the principal amount of the mortality in the fleet, every year, in the Indian and Chinese waters. On the other stations they are less prevalent and destructive. Everywhere, at times, especially during the summer and autumn, more or less severe outbreaks occur in particular ships—often on board those in harbour on the British coast, as well as in the Mediterranean and elsewhere. The diarrhœa is sometimes decidedly choleraic in character—occasionally sporadic cases of malignant cholera are met with, usually between the beginning of July and the end of September.

Dysenteric attacks are more frequent and severe in the Mediterranean and West India than the Home fleet, but are seldom productive of much mortality. Of the entire number, 492, of deaths from dysentery and diarrhœa throughout the service in the three years under review, 425 occurred in the East India and China fleets. In the year 1858 alone, there were 252 deaths. On this station, also, most of the deaths from cholera took place, namely, 138 out of 160, the entire number. Of these, 110 occurred in 1858.

A good deal of the sickness on this station is ascribed to the recklessness and wilful neglect on the part of the men of the most obvious precautions. The officers, generally speaking, suffer much less than the men, and this in consequence, mainly, of their greater attention to their food and clothing, and more temperate habits.

The use of the impure water of the Chinese and Indian Rivers is set down by some as having much to do with the prevalence of alvine flux in the fleet upon this station; and yet it is alleged that the crews of the ships who drank only water distilled from their engines have suffered as much as those by whom no such precaution was observed.

It has been observed that diarrhœa has sometimes attacked the crews of vessels on entering the rivers of China, before they had any communication with the land, or had partaken of any food or drink peculiar to the locality, the origin of the disease in such cases has been referred to malaria; but, at other times, the ship's companies entirely escaped any degree of bowel complaint until after they had begun to use the river water. And this difference in respect to the period at which the disease occurred would be observed usually in the different vessels of the same fleet, and at the same season of the year.

As Dr. Milroy remarks, the fact, that the tendency to diarrhœa and dysentery is greatly increased by exposure to an impure atmosphere, is fully recognized by medical men everywhere. These diseases are the most common pest of crowded and ill-found emigrant and transport ships in all climates, and are more destructive than almost any other to armies, whether in the field or in unwholesome quarters and cantonments.

Long-continued observation has shown that bowel affections are much less frequent and severe among the Chinese than among Europeans, and more especially British sailors; and this difference has been attributed mainly to the use by the natives of a less stimulating diet, and to their abstinence from spirituous drinks.

We are somewhat surprised to find, that the amount of sickness throughout the English navy, from affections of the respiratory organs, including consumption, exceeds that from any other class of diseases, and often equals that from fevers and alvine fluxes conjoined. To take one year for example, in 1856, one-sixth of the entire sickness throughout the service was from this cause. The proportion varies on different stations; but the influence of mere climate is far less than might be supposed. Although not so high as in the Home station, where sudden and considerable atmospheric vicissitudes most prevail, there is still an immense amount in the milder and more equable regions of the Mediterranean, and even under the tropical skies of the Old and New World alike.

"The mere inclemencies of weather at sea, even when combined with exposure and great fatigue, have much less to do with the frequency and severity of these ailments than most people suppose; but it must be acknowledged that the reckless habits of seamen when on shore, and their disregard of ordinary precautions against wet and cold, contribute not a little to their production. With

respect to chest and throat diseases, as with fevers, and diseases of the bowels, we have to notice the curious fact that there is often a marked difference as to their prevalence in different ships of the same squadron, lying at the same locality, and engaged on the same or similar duties. Whether this difference is owing mainly to the damper state of the between decks in some ships than in others, according as the wet or dry mode of cleaning them is pursued, or whether some crews have greater facilities for drying their wet clothes and getting warm food or refreshment on going below after a cold and stormy watch, and before turning into their hammocks, or whether from any other cause, it is not easy to say."

The most startling fact developed by Dr. Milroy is in respect to the very great frequency of pulmonary tuberculosis in the English navy. A seafaring life has usually been considered as to a certain extent prophylactic of that condition of the system with which the development of consumption is associated. Experience has shown that, in more than one instance, civilians with a decided tendency to the disease, have, after a few voyages to sea, got rid entirely of such tendency. How comes it then that the disease should be so common among the seamen of the fleet, in every portion of the world to which it is sent?

Fevers, cholera, dysentery, and indeed every other malady to which seamen are liable, vary in their frequency and severity at different seasons, on different stations, and in different years. But in all years, and nearly alike in all climates we find consumption to prevail—causing, upon the whole, a greater amount of permanent loss to the service than any other single malady.

"During the years 1856, '57, '58, 339 deaths were caused by consumption, and 111 by other diseases of the respiratory organs, chiefly pneumonia and bronchitis. In the same period 533 seamen were discharged out of the service on account of consumption—which in the great majority of cases would prove fatal within six months of their discharge—and 171 on account of other confirmed pulmonic diseases. The average of deaths from consumption alone averaged for the three years 2.6 per 1000 of strength; and the corresponding ratio of the number of men invalided on account of this disease was 3.9."

The Royal Commission to inquire into the sanitary state of the English army refer the great prevalence of pulmonary consumption among the soldiers generally, and its inordinate frequency among the household troops, to the close foul air of the crowded barrack-rooms at night. Dr. Milroy describes the atmosphere of the lower between decks of a ship of war, after the men have turned into their hammocks, as equally stagnant and impure. And, he remarks:—

"When it is remembered that the men have suddenly to turn out from this close, damp, and fetid air at night to go on deck in all weathers, the exceeding frequency of those ailments which always tend to accelerate the development of tubercular disease is only what might be expected."

By far the greater number of deaths in the English navy from diseases of the brain and nervous system—172 in all—are referred to the effects, more or less, of intemperance. They are classed under the heads of apoplexy and delirium tremens. The number hopelessly ruined in health and invalided, chiefly in consequence of epilepsy and insanity, swells the loss to the navy from nervous diseases to 501. This aggregate gives, however, but an inadequate idea of the entire sacrifice of life and service arising from intemperance. Independently of many attacks of disease attributable to intoxication and its consequences, very many of the violent deaths from drowning, suicide, etc. are due to it, while nine-tenths at least of all the crimes and offences are committed by the seamen whilst under the influence of liquor.

The amount of permanent loss to the navy by *invaliding from disease alone* always largely exceeds that by death from this cause. In 1856, '57, and '58 it was two-fifths greater; the total number invalided being 4221, and of this aggregate 3808 were from disease alone; the *deaths* during the same time from disease being 2125. Disease of the lungs was the occasion of 692 cases; three-fourths of these were consumptives. Disease of the bowels, chiefly dysentery, furnished 585 cases; and 162 cases were due to the sequelæ of fevers.

Various maladies which add but little to the death list cause, annually, a large amount of invaliding. During the three years, 1856, '57, '58, 448 cases were

due to rheumatic affections, 286 to diseases of the heart, 263 to ulcers and abscesses, 244 to hernia, 243 to venereal diseases, and 235 to debility—complicated generally with some internal organic mischief, often of the lungs. For the purpose of comparing the losses by war, and accidents specially incident to naval life, Dr. Milroy selects the Baltic and Black Sea fleets in 1854 and 1855, and the East India and China squadron in 1857, '58, during the period of hostilities with China and the Indian mutiny.

The total mortality during the Russian war, in the fleet, including the naval brigade and marines serving with the army before Sebastopol, was from disease 1574; from accidental injuries, suicide, and drowning, 228; from wounds received in action, 227.

In the Baltic fleet the loss from wounds received in action was only 15 in 1854, and in 1855 only 11. In the Black Sea fleet, in 1854 the total loss from the casualties of war, afloat and on shore, was 94. In 1855 there were 104 deaths from wounds received in action. Among the East India and China squadron, in 1857, there were 87 violent deaths out of a mortality of 327. Of these 87, 38 were from wounds received in action, 29 deaths resulted from drowning, 13 from accidents, 2 from suicide, and 3 from causes unknown.

In 1858, out of a total mortality of 706, of which 120 were deaths from violence, 35 were from wounds in action (in China 27, in India 8); 49 deaths were from drowning, 17 from accidents on board ship, 3 by suicide, 1 by lightning, and 15 from causes not positively ascertained—either from violence or injury while ashore on leave, or in action with the enemy.

Thus, in the three years—1856, '57, '58—82 sailors and marines lost their lives in action, and 89 by drowning.

During these three years the number of men invalided in consequence of accidents and wounds amounted to 483, out of a total of 4221 from all causes, or nearly one-tenth part of the whole.

The inference deducible from the foregoing facts is, that a considerable portion of the losses of men in the service of the navy are due to causes which are not inevitable to life on shipboard, or to the services in which the vessels of the navy are liable to be engaged during a state of peace or war. That most of these causes are apparent, and with due precautions may be prevented or removed. All that is necessary is that the attention of all the officers of the service, executive as well as medical, and of the general educated public also, be continually directed to watch the influence of every circumstance affecting the preservation of health and the occurrence of sickness in ships, and that all encouragement be given by the administrative authorities for the promulgation of sound opinions, and the tentative adoption of reasonable suggestions.

D. F. C.

ART. XIII.—*Hæmorrhoids and Prolapsus of the Rectum: Their Pathology and Treatment; with special reference to the Application of Nitric Acid. With a chapter on the Painful Ulcer of the Rectum.* By HENRY SMITH, F.R.C.S., Assistant Surgeon to King's College Hospital. Third Edition. London, 1862. 12mo. pp. 141.

IN the July number of this *Journal*, for 1860, we noticed the preceding edition of this work. The manner in which Mr. Smith employed nitric acid in the treatment of piles and prolapsus recti, which is the special point of interest in the book, is there fully described. In the preface to this present edition, the author states that in it he has described and illustrated certain modes of treating hæmorrhoids and prolapsus which were not alluded to before, but which his more mature experience has justified him in recommending, and that he has added, moreover, a short, but entire chapter, on the painful ulcer of the rectum, which is so often associated with, and mistaken for hæmorrhoidal disease.

After having enjoyed more extensive opportunities for treating hæmorrhoids, Mr. Smith has materially modified the views he formerly expressed in regard to

the use of nitric acid. As stated in the bibliographical notice above referred to, he was formerly of opinion that certain forms of hæmorrhoids definitely marked and easily recognized were speedily, painlessly, and permanently cured, by its application. He feels now bound to state that the objection brought against this agent, that it is an uncertain one, is to some extent valid, and that in a few cases where he has employed it himself with the greatest care, scarcely more than a trifling effect was produced. With respect to the permanency of the cure, in several instances, both of hæmorrhoids and prolapsus, where the agent has been employed, he has been able to ascertain that the result has been permanent in some, while in others there has been some slight and temporary return of symptoms readily removed by a resort to the remedy. With regard to the pain, Mr. Smith states that he has met with a case now and then, since the publication of the second edition of this book, in which the patient suffered somewhat severely, but when this has been so, either the mucous membrane to which the acid was applied was close to the verge of the anus, or a portion of the acid had, through carelessness, come into contact with the integument.

When there is a doubt about the case as regards the applicability of the nitric acid, and the patient is not a fit subject for the ligature, or will not submit to this operation, Mr. Smith, in the present edition, recommends as an excellent mode of treatment, one he states to have been originally suggested by the late Mr. Cusack, and highly spoken of by Mr. Lee. This consists in compressing the hæmorrhoidal tumour by means of a blunt pair of scissors or clamp, and snipping away the free portion with sharp scissors: the cut surface of the tumour is then carefully wiped with a piece of sponge or lint, and then the nitric acid is freely applied to every portion. Of course, no bleeding can take place if the base of the hæmorrhoid be well secured by the clamp; and so soon as the raw surface is thoroughly imbued with the acid, the clamp is removed, and although the pressure is taken off, bleeding is arrested by the action of the caustic. This mode of treatment Mr. Smith believes to be particularly well adapted to prolapsus of the rectum, and in the portion of the book devoted to this affection details of cases are given where hæmorrhoidal tumours and prolapsus of the rectum were thus successfully treated.

In the newly added chapter on the painful ulcer of the rectum is contained nothing that is worthy of notice as new, and many things are omitted that should have been inserted. The chapter is by no means one to be styled "entire," in the usual acceptation of the word; on the contrary, it is in every way incomplete and defective.

The several editions of Mr. Smith's work display on the part of the author more of enthusiasm and of frankness, than of discretion. He has too hastily published the immediate results of a particular mode of treatment, with which he had become delighted, and after further experience he has candidly acknowledged its failures. W. F. A.

Art. XIV.—*On the Diseases impeding Reproduction in the Male and Female: being the Pathology and Treatment of Spermatorrhœa, Impotency, and Sterility.* By Marris Wilson, M.D., M.R.C.S.E. London: Tallant & Co. [The author reserves the right of translation.] 8vo. pp. 225.

In the number of this Journal for January, 1859, we noticed an edition of the well-known treatise of Lallemand on *Spermatorrhœa*, to which was added a treatise by Dr. Marris Wilson, entitled *On Diseases of the Vesiculæ Seminales and their Associated Organs; with special reference to the Morbid Secretions of the Prostatic and Urethral Mucous Membrane.*

The present volume consists of the latter treatise, with extensive additions. Impotency and sterility are treated of, and anatomical descriptions and explanations of the male and female organs of generation are introduced. This the author has endeavoured to do "as concisely as possible, and with an avoidance,

as far as it could be done, of any technical expressions." "It must be acknowledged," he adds, "that one of my purposes has been to lay the conditions plainly before those interested, and give them at least the chance of testing the many wild and groundless assertions made respecting these diseases by unqualified persons."

The citations we have made from the preface are sufficient to determine the character of this work of Dr. Wilson. Our examination of it has inspired us with intense disgust, and we must say that a proper regard for public morals would lead to its publication being suppressed. W. F. A.

ART. XV.—*A Medical Handbook, comprehending such Information on Medical and Sanitary Subjects as is desirable in Educated Persons: with Hints to Clergymen and Visitors of the Poor.* By FREDERICK WILLIAM HEADLAND, M. D., B. A., F. L. S., Fellow of the Royal College of Physicians, etc. 12mo. pp. 348. London, 1861.

THE work before us is, in strict parlance, a compendium of so much of the science and art of medicine as relates to the means of preserving health and of curing disease, drawn up expressly for popular use.

To teach every man to be his own doctor by simply placing in his hands a popular treatise or manual of the practice of medicine is impossible; the attempt has always been not only a failure, but the cause of positive mischief, and that often of a very serious character.

To decide upon the true character of disease, and detect the modifications produced in it by causes connected with the sex, age, constitution, temperament, pursuits, and condition in life of the individual in whom it is met with, or with the climate, location, and season at which it occurs, and with the prevailing epidemic tendencies; to apply with judgment and success the remedial measures best adapted for the control of whatever disease is ascertained to be present, demands an amount of professional knowledge and skill which can be mastered only by an entire devotion to the task of the time and talents of whoever shall pretend to assume in any case the office of physician. The practice of medicine must necessarily, therefore, be committed to those who have been expressly educated for that single object, and who are prepared to make it their sole and entire pursuit.

While we insist that it is impossible to write a book which shall enable the unprofessional reader to diagnosticate and treat diseases, still we are convinced that a work might be prepared for popular use, which would be eminently serviceable in pointing out the causes of disease, and teaching how these deleterious influences may be guarded against.

The handbook of Dr. Headland does not, we fear, fulfil the requirements for such a work. The first part—the hygienic portion—though sound in its doctrines, is very superficial; and in the second portion the author has attempted what it is impossible to accomplish, and has of course failed. D. F. C.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Absorbing Power of the Human Skin.*—Dr. MURRAY THOMPSON, Lecturer on Chemistry, Edinburgh School of Medicine, relates (*Edinb. Med. Journal*, May, 1862) some experiments which he tried on his own person to ascertain the truth of the statements made as to the curative power of mineral water baths, depending on the absorption by the skin of certain salts and other substances which they hold in solution; and further, to ascertain whether certain substances applied in the form of ointments, &c. pass through the skin and reach the blood before they produce any beneficial effect.

His conclusions are, "that not only has absorption by the skin been greatly exaggerated, but that, in the case of substances in aqueous solution, it seems to be the exception, not the rule, for absorption to take place; and, in the case of ointments, etc., some substances so applied appear to be absorbed and others not. For instance, I have nowhere read any contradiction to the well-known statement that mercury is absorbed in inunction. My own trials, though too few to lead me to an opposite conclusion with regard to iodine and iodide of potassium, certainly tend in that direction.

"As to the tincture of iodine, my many experiments with it compel me to say that it is seldom or never absorbed. As far, therefore, as the specific action of iodine is concerned, this remedy might be abandoned. At the same time, I am quite aware that painting with tincture of iodine is held to operate beneficially as a counter-irritant. I do not for a moment question this view of its use. My experiments lead me only to the conclusion that the iodine in it is not absorbed."

2. *Researches on the Influence of Culinary Salt and Coffee on the Metamorphosis of Tissue.*—Culinary salt, according to the researches of C. VOIT, is a powerful stimulator of the metamorphosis of tissue; it increases, by means of its physical properties, the capillary circulation of fluids in the organism; it increases the oxidation of albumen, and through this the quantity of urea excreted. Culinary salt is also a true diuretic. In order to excrete the salt from the body, water is required; this water passes always through the kidneys (the only channel for the excretion of culinary salt in the dog), and is, if the supply of water from without is limited, abstracted from the tissues.

Voit's experiments with *coffee* on a dog led to the inference that coffee does not, as is usually assumed, diminish the metamorphosis of nitrogenous tissue, and the excretion of urea, but, on the contrary, rather increases these processes. On the whole, the dog appeared to be more lively after the use of coffee. The author made also experiments with *coffein* on frogs, and found it to cause, at first, increased irritability of the nervous system, a tendency to reflex-movements and to tetanic convulsions; later, however, phenomena of paralysis. The pupil

becomes dilated; the capillary vessels are filled with blood; the heart's contractions are at first increased, later reduced in frequency, they are arrested during the tetanic paroxysms. The author attributes the principal effects of coffee to its action on the nervous system, not to its influence on the tissue-change. The nervous system being rendered more susceptible, the same exciting cause produces a greater effect. Coffee thus refreshes, Voit thinks, the fatigued body, renders the lassitude less perceptible, and in this manner enables us to endure prolonged exertion. The experiments on the influence of *bodily exercise* (treadwheel) on the tissue-change in the well-known dog lead to the unexpected result, that the excretion of urea was not at all, or only very slightly, increased by bodily labour. Voit infers, therefore, that muscular action does not cause increased decomposition of albuminous substances, while it is accompanied with a greater consumption of fat. As the decomposition of albumen is not the source of the production of force, connected with muscular contraction, Voit is inclined to look for it in the development of electricity.—*Brit. and For. Med. and Surg. Journ.*, July, 1862.

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3. *Calorific and Vascular Nerves of the Sympathetic.*—M. CLAUDE BERNARD, in a paper, the first of a series to be presented to the Academy of Sciences, endeavours to demonstrate that the vascular and calorific nerves are special nerves to be topographically and physiologically distinguished from the ordinary motor nerves. Having opened the spinal canal in dogs, he divided as they left the cord all the origins of the sacro-lumbar plexus (sometimes on one side and sometimes on the other) which supplies sensation and motion to the hinder extremity. The limb became completely paralyzed, but no calorification or vascularization was observed, the temperature on this side often, indeed, diminishing. When only the posterior and anterior roots were divided, corresponding abolition of sensation or of motion occurred; but in neither case was there any vascularization or change of temperature in the limb. In a dog in which complete paralysis of the left hind leg was produced by division of the origins of the sacro-lumbar plexus, the sciatic nerve was afterwards divided. Its origin having been already divided, the subsequent section was not felt, and added nothing to the paralysis of motion and sensation that already existed; but vascular and calorific phenomena immediately followed, the temperature of the limb steadily rising until it was from 6° to 8° C. higher than that of the opposite one, and so continued until the death of the animal next day.

The experiment was repeated a great many times with exactly the same result. It is evident, therefore, that nerves influencing these functions must have become adjoined to the motor and sensitive nerves in the short interval between their issue from the canal and the point where the sciatic was divided. It is only the sympathetic, placed on the sides of the spinal column, which could thus become joined to these nerves; and M. Bernard in another experiment, destroyed the ganglion of the sympathetic and its filaments, which lay upon the side of the fifth and sixth lumbar vertebræ, leaving the nerves of the sacro-lumbar plexus entirely intact. An excess of temperature in the limb was immediately observed, and during the three days the animal lived, the paw of the side operated upon was from 5° to 8° hotter than the other—no paralysis whatever being present. The conclusion to be drawn is that there are three distinct descriptions of nervous influence—1. The sensitive, due to the posterior roots of the sacro-lumbar plexus; 2. The motor or muscular, belonging to the anterior roots; and 3. The vascular and calorific, due to the sympathetic.—*Med. Times and Gaz.*, Aug. 23, 1862, from *Gaz. des Hôp.*, No. 94.

MATERIA MEDICA AND PHARMACY.

4. *Is Alcohol Food?*—Dr. THOMAS INMAN, of Liverpool, read an interesting paper on this subject before the British Medical Association at its late meeting in London.

The author first devoted a few words to definition, stating that by "alcohol"

he intended to comprise those liquors in common use which owed their effects to alcohol; and by "food," anything which supplied material by which the body was nourished. He then adverted to the fact that a saccharine material was found in the blood of all mammals when it entered the lungs, and to the strong probability that a fermentative process took place in those organs, with the extrication of carbonic acid, the actual source of which in the blood had not yet been absolutely ascertained. The close atomic composition of starch and sugar and alcohol *plus* carbonic acid was pointed out; also the fact that the starches, &c., and alcohol were often tolerated by delicate stomachs when other ingredients were not tolerated.

The author then shortly summarized the effects of ordinary food, whether animal or vegetable, when taken with water for a beverage and in proper quantity, and compared these with the results following a temperate draught of ale or porter; showing that there was no real distinction between the one and the other, except that the liquid sooner entered the circulation and sooner left it. It was no argument against the use of beef that a man who had dined on it one day wanted a dinner the day after; nor against beer, that a person who had taken one glass was ready for another in a few hours. The prejudicial effects of excessive eating were adverted to, and after mentioning a few instances where guzzling had proved fatal, others were alluded to in which a prolonged lethargy or an apoplectic condition had been induced. The use of beef tea sometimes produced convulsions in infants, but this result did not vitiate the dietetic value of meat. The physical condition of excessive eaters was then spoken of, and it was shown that some were thin, others stout; and that as regarded the moral condition of those who, from choice, religious belief, or necessity, abstained from the use of alcoholic beverages, they were to the full as bad as those who indulged in drink. Cannibals were teetotallers, and neither Nana nor Tippoo was a drunkard. On inquiring into the habits of total abstainers and those who drank ale, wine, &c., the author had ascertained that the former habitually ate much more than the latter; and one of three deductions was necessary: either the former ate too much, the latter too little, or the drink of the one was equivalent to a portion of the food of the other. To ascertain which of these alternatives was nearest the truth Dr. Inman had experimented in his own person, and had made numerous observations through the assistance of friends. The conclusion he came to was that which had been previously insisted on by Mr. Lewes and others—namely, that alcohol replaced a certain amount of food; and "as things which are equal to the same are equal to one another," he inferred that if a glass of ale was equal to a slice of mutton in its satisfying effect, and that mutton was food, it must follow that ale is food. To say that persons could not live on ale, was of no value as an argument; for no one could live on biscuit alone, though bread was called the staff of life. To ascertain how far it was possible for any one to live on alcohol alone, he had for many years been seeking information respecting drunkards, and he mentioned two—one on the authority of the individual herself (a surgeon's widow), and the other on the authority of the medical attendant, where patients had subsisted for a prolonged period on brandy and water alone. He mentioned others on the authority of other medical friends, and two which he had himself been conversant with. He combated the idea of the probability of imposture, inasmuch as in all these cases solid food was loathed excessively, and was generally rejected by the stomach. He then mentioned some cases of children that he had attended, in whom the appetite had failed entirely, where food which was administered by force had been vomited, yet in these alcohol in one form or other gave the support which other food did not, and gradually restored the appetite to its normal state. He noticed, too, that infants at the breast, when ill, would digest brandy and water when they would reject all else. The advantageous influence of this fluid was apparent even if it were administered in enemata.

A definite course of induction, irrespective of chemical theory, having ended in the conclusion that alcoholic drinks were strictly alimentary, he shortly referred to the statements which were relied upon to demonstrate the contrary. If alcohol, he said, passed out of the system unchanged, so did water; yet water was absolutely necessary to life. But there was no proof that all the alcohol

imbibed in a long symposium ever left the body. He inferred that if it did pass out of the lungs in vapour as largely as was assumed, a party of spirit drinkers would make the atmosphere of a closed room explosive; and he recalled the statement of Pereira, that some northern race had found that two or three people in succession might keep up intoxication with "lolium temulentem" by drinking the urine of the first eater; yet none had discovered that the urinal of a drunkard contained anything equal to gin. But certain foods, as oatmeal, bran, potatoes, oats, &c., were not wholly retained in the system, yet they were alimentary.

Dr. Inman then combated the idea that alcohol was a mere stimulant, by contrasting it with turpentine, cantharides, ginger, cayenne, iodide of potassium, and other drugs, which were stimulants to every part of the body to which they were applied. He argued that alcohol could not simply be a conservator of tissue; for a glass of ale after a long walk would induce plentiful perspiration, and a glass of whisky or gin and water acted with most people as a powerful diuretic. Nor could we conclude that it assisted in disintegrating the tissues; for if it did, the use of ale, wine, or spirit must then be antagonistic or antidotal to food, and the winebibber must necessarily require more food than the teetotaller, whose tissues were not disintegrated by artificial means.

He then summed up his conclusions thus:—

1. Nature has provided in the salivary glands, the liver, and the lungs of every mammal an apparatus for converting all food, especially farinaceous, into alcohol; and we have no evidence that such conversion does not take place.

2. One form of alcohol or another is available for the support of life, and for restoration to health when no ordinary food can be or is digested.

3. Alcohol, after being taken, is incorporated with the blood, passes into the various tissues, and ultimately disappears, a small portion only passing away in the breath. We can say no more of bread, potatoes, or oatmeal porridge, a small portion of each of which passes out of the body with the feces.

4. Alcohol, in the form of ale, porter, wine, &c., relieves hunger and quenches thirst simultaneously, and with a completeness that is not equalled by water, infusion of gentian, cayenne pepper, or by turpentine—i. e., it does not act as water simply, or as a stimulant alone.

5. Wine, beer, &c., satisfy the appetite when taken alone, and act for the time like any solid food would do.

6. When alcohol is mingled with other food, a less amount of the latter suffices for the wants of the system than if water had been used as the drink.

7. The various forms in which alcohol is taken have as marked and specific effects as have animal and vegetable articles of diet.

8. Individuals have subsisted wholly upon one or other of the various forms of alcohol in common use for periods of great length; and as it is illogical to conclude that they must have lived on air, without food, or on flies like chameleons, the conclusion is irresistible.

What that conclusion is, it might be left for every thinking man to decide.—*Lancet*, August 16, 1862.

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5. *Rennet Wine.*—Dr. GEO. ELLIS states (*Dublin Med. Press*, July 16, 1862) that about two years since, having failed to obtain benefit from the preparation called pepsin, he had recourse to the direct preparation of a solution of gastric juice from the calf's stomach, and with the most satisfactory results. His mode of preparing is as follows: "Take the stomach, or rennet bag as it is called, of a calf fresh from the butcher; cut off about three inches of the upper or cardiac extremity, which portion, as it contains fewer glandular follicles, may be thrown away; slit up the stomach longitudinally; wipe it gently with a dry napkin, taking care to remove as little of the clean mucus as possible; then cut it into small pieces (the smaller the better), and put all into a common wine bottle; fill up the bottle with good sherry, and let it remain corked for three weeks. At the end of this time it is fit for use.

"*Dose.*—One teaspoonful in a wineglassful of water immediately after meals.

"*Test of quality.*—One teaspoonful will solidify, to the consistency of blanc-mange, in from one to two minutes, a cup of milk (about eight ounces) at the temperature of 100° Fahr.

"In this action on the casein of the milk, it may be said that the wine itself might have some effect. This, however, cannot be the case, as wine will not solidify milk, and it will only curdle it at a much higher temperature, and in larger proportion."

A single dose of this preparation, which Dr. E. calls rennet wine, given daily after dinner, will, he says, "be found quite sufficient to act speedily and effectively, without other treatment, in the common run of cases of functional disorder of the stomach. It is not, perhaps, easy to explain the operation of this small quantity when we consider the large supply of the gastric secretion required for the thorough digestion of an ordinary meal. The action is probably due to those indirect chemical changes called catalytic transformations, which some organic substances, by their mere presence and contact, induce in each other, and in other proximate principles. Thus the conversion of a small portion of food in the stomach into healthy albuminose by this small quantity of sound gastric juice may induce the same healthy action throughout the stomach contents during the entire process of stomach digestion. It is at least equally difficult to explain the action and rapid extension of ferments generally in their appropriate solutions. I have often been forcibly struck by the magical effect of this small dose in removing offensive odour from the breath of young persons —a distressing symptom sometimes aggravated rather than relieved by purgative medicine; and I may also mention that in one of these cases cod-liver oil was easily tolerated afterwards though never before."

6. *Preparation of Oxygenated Water, and its Therapeutical Use.*—Dr. Ozanam gives the name of oxygenated water to water which is distilled and afterwards charged with oxygen under the influence of high pressure. The experiments he has made have led him to establish three modes of operation by this new medicine. 1. It improves the condition of the blood in cases where that fluid is impaired or deficient, as in dyspnœa, asthma, slow asphyxia, cyanosis, diseases of the heart, hæmorrhoids, and hæmorrhoidal visceral congestion. 2. It possesses an oxidizing or metamorphic action in cases where the organic products are arrested in their development, as happens in glycosuria, gout, the uric and oxalic gravel, and perhaps in scrofula. 3. It exerts an exciting and regulating action on the brain and the thyroid gland, and hence its use in goître and cretinism. If, in fact, snow-water taken as drink gradually produces these morbid conditions, it is because it is entirely deprived of vital air. On the other hand, oxygenated water, as well as the inhalation of gaseous oxygen, produces no results in hemicrania, and unfavourable ones in cases of inflammatory disease. Thus, in croup, the oxygen temporarily tranquillizes the dyspnœa, but it increases the fever. In the treatment of ulcerated cancer the oxygenated water revives pretty well the powers of the patient, and the wounds assume a more vivid and rosy colour, but they do not heal; and if the surfaces are bathed with rags steeped in oxygenated water, even when very slightly charged, the ulcer is soon observed to become gangrenous on the surface. Oxygenated water is perfectly limpid and pure, and the gas is disengaged in the form of very fine bubbles. Having little taste, it resembles in this respect water which is deprived of air; and, like the latter, it is a little heavy for the stomach.—*B. and F. Med.-Chir. Rev.*, July, 1862, from *Compte Rendu de l'Acad. des Sc.*, November, 1861.

7. *Medical Properties of the Wild Thyme* (*Thymus Serpillum*) *and its Use in Spasmodic Cough.*—M. Joset states, that by the simple administration of an infusion of wild thyme, slightly sweetened and mixed with gum, he has observed the improvement and even the cure, as if by enchantment, of cases of hooping-cough, taken indifferently at all the periods of the disease. The same was the case in stridulous sore throat, and in convulsive and catarrhal coughs. In the worst cases of hooping-cough the pathognomonic paroxysms, although they did not entirely disappear at the end of a few days, became so much modified in their character, that the disease resolved itself into a case of simple bronchitis, which was easily treated. These remarkable cures, so rapidly effected, and obtained only by the administration of wild thyme, have led M. Joset to look upon this plant as a sovereign remedy, and in some degree a specific one, in the affections

of the air-passages. The employment of this plant is not a novelty, for it was formerly recommended very extensively in the treatment of obstinate coughs, and it enters into the formation of some popular powders and syrups. M. Joset advises it to be given in the form of a concentrated infusion, slightly sweetened, to be taken in any quantity which the patient can drink, and until the desired effect is produced. The favourable result has generally ensued at the end of a very few days.—*B. and F. Med.-Chirurg. Review*, July, 1862, from *Revue de Thérap.*, February, 1862.

8. *Chemistry and Properties of the Cytisus Laburnum.*—Dr. T. S. GRAY publishes (*Edinb. Med. Journ.*, May, 1862) an elaborate investigation on this subject. The following are his conclusions:—

"1. That the crude drug has no irritant properties, and that the sickness and vomiting which it produces when administered in large doses are due to some action on the nervous system.

"2. That these disagreeable symptoms may be, to a certain extent, avoided by administering it in small doses.

"3. That it is not, as is generally supposed, a purgative when administered in small doses.

"4. That in small doses it has useful therapeutic properties.

"5. That the activity of the drug is owing to the presence of three vegetable principles, and not of one, as stated by MM. Chevallier and Lassaigne.

"6. That the principles, when carefully separated, have valuable narcotic and stomachic properties.

"7. That they have not the tendency of the crude drug to produce sickness and vomiting, unless when given in very large doses.

"8. That these principles are yielded in such quantity by the laburnum tree that they might with advantage be introduced into the pharmacopœia.

"9. That the principles are yielded by all parts of the tree, but in largest quantity by the bark and seeds.

"10. That the administration of charcoal will be found useful in the treatment of poisoning by laburnum."

9. *Iodide and Oxyiodide of Antimony and their Therapeutic Action.*—Dr. VAN DEN CORPUT has employed in his practice for more than a year the different compounds of iodine with antimony, and the oxyiodide in particular has yielded such remarkable results that he considers it to be one of the most active of the antimonial preparations. The iodide of antimony is obtained by carefully heating in a glass retort one equivalent of powdered metallic antimony with three of iodine. The mixture soon fuses in the form of a thick liquid of a deep brownish-red colour, which is the iodide of antimony; and on cooling it solidifies into a mass which has a metallic fracture, and furnishes a powder of a brick-red colour. If great heat is employed, the iodide is volatilized without decomposition, and is condensed in the form of shining translucent scales. The reaction takes place with the disengagement of heat, and may lead to an explosion if too large a quantity is operated upon at one time, and therefore it is better to add the metallic antimony gradually to the iodine. The iodide of antimony, when in contact with water, is decomposed in the same manner as the chloride, into soluble hydriodic acid and a pulverulent yellow precipitate formed of hydrate of oxide and iodide of antimony, analogous to the powder of Algaroth. Alcohol also decomposes it by removing iodine. The oxyiodide of antimony is the only chemical form in which the combination of iodine and antimony can be conveniently used for internal administration, since by the contact with the liquids of the digestive canal the iodide of antimony is decomposed, as it is in water, into insoluble oxyiodide of antimony and hydriodic acid. The oxyiodide of antimony may consequently be obtained by rubbing up iodide of antimony with water, and thus decomposing it into hydriodic acid and oxyiodide of antimony of a bright yellow colour; but it is better to prepare this compound by adding an acid solution of chloride of antimony to a solution of iodide of potassium. A precipitate is immediately formed of a beautiful lemon-yellow colour, which after a few minutes changes to an orange yellow. When the decomposition is complete,

the precipitate is collected on a filter, washed, and dried. It is decomposed by most of the acids; hydrochloric acid dissolves it, setting the iodine free; and caustic alkalies also change it by combining with the iodine. When exposed to heat, it is resolved into antimonious acid and iodide of antimony, which is volatilized.

The researches of Dr. Van den Corput have convinced him that the iodide of antimony is chiefly adapted for external application as a revulsive. The irritating properties of this salt resemble those of tartarized antimony; while the oxyiodide, corresponding in its composition to Kermes' mineral, produces internally an action analogous to that of the last-named preparation, although its special effects are much more powerful. The oxyiodide is, in fact, a drug of great efficacy, being at the same time an expectorant and a powerful alterative. When suspended in a mucilaginous vehicle, in the dose of from 5 to 25 centigrammes (a centigramme is .1543 of a grain), it frequently excites at first nausea and sometimes vomiting, at other times it causes frequent and copious stools. The effects may be easily moderated by the addition of opiates or some other narcotic agent which is capable of deadening the susceptibility of the stomach. Tolerance appears to be established more readily, as in the case of tartarized antimony, by doses raised from 20 to 50 or even 70 centigrammes in twenty-four hours. In general, when taken in such doses, the drug excites at first a great diaphoresis, soon followed by diminution and considerable depression of the pulse. The number of inspirations is diminished in frequency, and this effect is accompanied by extreme muscular weakness. The oxyiodide of antimony is particularly serviceable in inflammation of the parenchyma of the lungs, and especially in the second stage of pneumonia; also in the treatment of subacute bronchitis and of œdema of the lungs. Its alterative and diaphoretic properties are also manifest in the treatment of acute rheumatic affections, as well as in certain inflammatory diseases of the heart. As to the iodide of antimony, its employment must be limited to the outside of the body. When applied to the skin, in the form of plaster or ointment, it produces an energetic revulsion, by causing on the surface a pustular eruption similar to that produced by tartarized antimony. But it has this advantage over the latter, that, independently of its local derivative action, it operates besides on the organism in a general manner by giving up a part of its iodine, which is then either directly absorbed, or by being vaporized by the heat of the body, surrounds the patient with an iodized atmosphere.—*B. and F. Med. Chirurg. Rev.*, July, 1862.

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10. *Professor Polli on Sulphites.*—A new series of salts, the sulphites, bisulphites, and hyposulphites of potash, soda, lime, and magnesia, which have hitherto been known only by the chemist, bleacher, and photographer, has of late been admitted into our materia medica; and as they are not, like Dr. Churchill's hypophosphites, recommended as specifics against one special disease, but as useful remedies for a great variety of morbid conditions, acute as well as chronic, local as well as constitutional, they are likely to fulfil at least part of their promises, and deserve the more to be thoroughly tried, as they can be administered even in large doses without any danger to the system. Some of the hyposulphites have already been tried in France; but the sulphites are, as far as I am aware, quite new in medicine. Their active principle is, in all probability, sulphurous acid, and its *modus agendi* is explained by an alleged decomposition of the salt, the subsequent change of sulphurous acid into sulphuric acid at the expense of the blood or the tissues; and the final formation of sulphates, which can always be traced in the urine, about twelve hours or even sooner after the administration of the drug. Whether the action of these salts, or of the sulphurous acid they convey, be called antiseptic, or antifermentative, or disinfecting, is of no importance. They are, at all events, likely to have alterating effects, and the results of therapeutical experiments, as far as they are extant, have confirmed this *à priori* supposition. The following is the experience of Professor Polli concerning these new remedies:—

1. The sulphite of *soda* is soluble in water, and of an unpleasant taste; dose ʒj to ʒij per diem. A solution of one to ten grains may be used for lotions.

The bisulphate of soda is also soluble, but its taste is so bad that it should only be used externally, dissolved in ten parts of water.

The hyposulphite of soda is soluble, and of tolerable taste. Dose gr. x to ℈ij per diem.

2. The sulphite, bisulphite, and hyposulphite of *potash* are all soluble; but only the last-mentioned should be administered internally, in doses varying from gr. v to ʒj per diem.

3. The sulphite of *magnesia* is the most soluble of all sulphites, the richest in sulphurous acid, and the least unpleasant to the taste. ʒss to ʒij may be given per diem, in ten grain doses.

The bisulphite and hyposulphite would be equally suitable for internal use, but are better dispensed with, as they are, by air and moisture, rapidly changed into sulphite of magnesia.

4. The sulphite of *lime* requires 800 parts of water for solution, while the bisulphite and hyposulphite are easily soluble. These three salts have been given in doses of only gr. iij to gr. vj per diem. Signor Polli recommends them in the purulent stage of consumption, where they are, according to him, apt to check the absorption of purulent matter and to favour the cicatrization of vomicæ. This seems a kind of *ex cathedrâ* argument, but the remedy will probably prove as good as any other.

5. Lastly, the sulphite, bisulphite, and hyposulphite of *ammonia*, are all very deliquescent, and of a pungent taste. They are easily changed into sulphates, and can only be used externally.

All the sulphites which can be administered internally may be given either in powder, mixed with sugar, and flavoured according to taste, or in edulcorated solutions. The sulphite of magnesia and the three salts of lime are preferable for internal, the others for external use. The hyposulphites in general have been found to act most slowly, inasmuch as they must first pass into the state of sulphites. They are rapidly decomposed by vegetable acids, but not altered by acetic acid, whence Signor Polli concludes, that during their use all kinds of fruit should be avoided, while vinegar may be allowed.

Having first tried these salts in animals, and having found that dogs can take as much as two or three drachms a day without showing any symptoms of disturbed health, Professor Polli commenced a series of clinical experiments, which were imitated by a few other practitioners, in a great variety of cases which hardly admit of classification. Although Signor Polli endeavours to make out that in all these cases the efficacy of the salts is due to the antifermentative action of the sulphurous acid they convey to the system, it remains still to be shown whether so many different diseases can fairly be attributed to the old bugbear of fermentation. But, leaving apart this dogmatical side of the question, I shall simply enumerate the principal diseases in which the sulphites have hitherto been given with success.

1. *Eruptive fever*, smallpox, scarlatina, and measles, especially their malignant forms; erysipelas, zoster, acute pemphigus.

2. *Chronic eruptions* require the additional application of lotions or ointments, made of hyposulphite of soda. As an excellent prophylactic remedy against contagious diseases of the skin, Signor Polli recommends the hyposulphites, especially that of soda, of which he gives from forty to sixty grains daily. He lays great stress on the sluggishness with which these salts undergo their chemical changes within the intestinal canal; and his belief in their prophylactic powers seems to be chiefly founded on this fact. But as nothing short of statistics can save the reputation of a prophylactic, we must wait for further experience before the value of these new remedies can be considered as fully established.

3. *Ulcers.*—Professor Polli excludes scrofulous and syphilitic sores, but it appears that other practitioners have tried the sulphites even in such cases, and not without success. I cannot find a case of genuine primary chancre thus treated. But an old sore, which had resulted from the opening of a bubo, has most successfully been treated by Dr. Galligo with lotions of sulphite of magnesia (1 : 20), the same remedy being also prescribed for internal use.

4. *Gastric and rheumatic fevers.*—For the so-called febris pituitosa of children, Signor Polli knows no better remedy than the sulphite of magnesia.

5. Absorption of purulent matter after surgical operations, nosocomial fever, puerperal fever, inflammation of the lymphatic vessels and glands from cadaverous infection. In all these diseases the curative action of the sulphites has been very striking, and has been further elucidated by a series of experiments on animals, which have led to important results. It was found that after a previous administration of sulphites, either given internally or injected into the veins, animals resisted the action of purulent and even putrid matter subsequently introduced into their system. When the latter was injected first, and sulphates given internally or injected afterwards, the deleterious action of the poison could always be arrested, even when its first symptoms had already set in. The effects are probably modified according to the quantities of matter used. But if the facts just mentioned should be confirmed by further experience, these new remedies would have to be considered as most important additions to the therapeutical stock, especially of veterinary surgeons.

6. Acute rheumatism, miliary and typhoid fever, have also been treated with sulphites; but Signor Polli speaks less confidently of these cases.

7. I have already mentioned that the sulphite of lime is recommended in pulmonary consumption, on account of its supposed tendency to produce cicatrization of vomicæ.

If, lastly, Professor Polli invites his medical brethren to try his sulphites also in cholera and intermittent fever, he evidently weakens his cause, although we may excuse excess of paternal partiality for a new-born remedy which bids fair to have a long and brilliant career, and which certainly deserves as much consideration as the podophylline and other children of fashion.

All sulphites used for therapeutical purposes should be prepared by the pharmacist, as those hitherto met with in commerce are far from pure. Signor Polli found that a compound sold to him as sulphite of potash contained sulphate of potash, clay, and some other insoluble matter; while a thing sold as sulphite of lime contained quicklime, carbonate and sulphate of lime, chloride and sulphuret of calcium, and some resinous matter. In order to avoid the possibility of mistakes, I will add that the sulphites here spoken of are represented by the formula $MO + SO_2$, the bisulphites by $MO + 2\ SO_2$, and the hyposulphites by $MO + S_2O_2$, without any reference to the additional multiples of water.—*Med. Times and Gazette*, June 14, 1862.

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11. *Glycerole of Tar* (Tar Plasma).—A combination of glycerine and tar has been used recently in skin affections instead of the tar ointment of the Pharmacopœia. The advantages seem to be that the glycerine compound is more readily absorbed, and less difficult to remove by washing. Mr. Brady states that he has not been able to find a formula for the preparation in question, neither can he learn that any published one exists, and would, therefore, propose the following, as yielding an unexceptionable product. The strength is the same as that of the unguentum picis liquidum, P. L.: Price's glycerine, six oz. weight; tar, six oz. weight; powdered starch, two drachms. Warm the glycerine, stir in the starch, add the tar, and raise the mixture rapidly to the boiling point. Strain through a cloth, if necessary, and stir while cooling. The mere mixture of glycerine and tar heated in a water-bath, gives on cooling a spongy mass, the pores of which are filled with glycerine; after standing some time, complete separation takes place. Tragacanth, acacia, soft soap, and many other things have been tried as substitutes for the starch, but none of them with so good result. Made according to the above formula, glycerole of tar is a dark brown mass, perfectly smooth, in consistence somewhat softer than the ointment.—*Dub. Med. Press*, Sept. 10, 1862, from *Pharm. Journ.*

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

12. *Suspended Animation.*—The Royal Medical and Chirurgical Society some time since appointed a committee to investigate and report on this subject. This committee has recently (July 1) made an elaborate and highly interesting report, of which we lay before our readers a brief summary.

The inquiry was conducted—By means of experiments upon living animals; by means of experiments upon the dead human body. In investigating anew the subject of apnœa by means of experiments on the lower animals, it seemed expedient to observe, in the first place, the principal phenomena of apnœa in its least complicated form—namely, when produced by simply depriving the animal of air. The principal facts to which attention was directed during the progress of the apnœa thus induced were—The duration of the respiratory movements; the duration of the heart's action. The duration of the heart's action was observed—(*a.*) In relation to the duration of the respiratory movements. (*b.*) In relation to the time after the stoppage of the breathing. From the experiments performed, it appeared that in the dog the average duration of the respiratory movements after the animal has been deprived of air is 4 min. 5 sec., the extremes being 3 min. 30 sec. and 4 min. 40 sec. The average duration of the heart's action is 7 min. 11 sec., the extremes being 6 min. 40 sec. and 7 min. 45 sec. From these experiments, it appears that on an average the heart's action continues for 3 min. 15 sec. after the animal has ceased to make respiratory efforts, the extremes being 2 min. and 4 min. respectively. Rabbits on an average ceased to make respiratory efforts in 3 min. 25 sec. Their heart's action stopped in 7 min. 10 sec.; consequently the interval between the last respiratory effort and the cessation of the heart's action was 3 min. 45 sec.

The next question investigated was—The period after the simple deprivation of air at which recovery is possible, under natural circumstances, without the aid of any artificial means of resuscitation. The experiments performed led to the conclusion that a dog may be deprived of air during 3 min. 50 sec., and afterwards recover without the application of artificial means; that a dog is not likely to recover, if left to itself, after having been deprived of air during 4 min. 10 sec. The force of the inspiratory efforts during apnœa was observed in the experiments to be so great that it was determined to measure them. They were found to be capable, in the dog, of raising a column of mercury four inches. It appeared, moreover, that their force increases up to a certain period. In other experiments, plaster of Paris, and even mercury, were thus drawn upwards into the minute bronchial tubes. It is easy to understand, therefore, how foreign bodies may be drawn into the lungs in cases of drowning, and the importance of this fact in the consideration of the pathology and treatment of apnœa.

The committee next passed on to the subject of drowning. The first question investigated was—For what period can an animal be submerged, and yet recover without the aid of artificial means? It was found as the result of numerous experiments on dogs that, in striking contrast to the previous ones, one and a half minute's immersion in water suffices to destroy life. Other experiments satisfactorily showed that the difference of time between simple apnœa and that by drowning is not due to submersion, or to depression of temperature, or to struggling, but that it is connected with the fact that in the one case a free passage of air out of the lungs, and of water into them, is permitted; in the other, the exit of air and the entrance of water are prevented. There can be no doubt, from other considerations put forward, that although both these circumstances are concerned in producing the difference observed, yet that it is mainly due to the entrance of water and the effects thereby produced.

The treatment of apnœa was next considered. For conclusions respecting artificial respiration the Committee refer to the second portion of the Report. Many other methods of resuscitation which have been recommended were employed, including actual cautery, venesection, cold splash, alternate application

of hot and cold water, galvanism, puncture of the diaphragm. Although some of the above means were occasionally of manifest advantage, no one was of such unequivocal efficacy in a sufficient number of cases as to warrant the Committee in specially recommending its adoption. The experiments upon the dead subject were made with a view to determine the value of the various methods which have been employed for alternately compressing and expanding the cavity of the chest in such a manner as to imitate the natural movements of the thoracic walls in breathing. The following methods have been investigated: 1. Pressure exerted by the hands on the anterior wall of the thorax, the body being in the prone posture. Such pressure has for its object to expel a portion of the air contained in the chest; on relaxing the pressure the chest expands and air enters. 2. The postural or so-called "ready" method, described by Dr. Marshall Hall, which consists essentially in "turning the body gently on the side and a little beyond, and then briskly on the face alternately;" and in making pressure along the back of the chest each time the body is brought into the prone position. 3. The method of Dr. Silvester, in which the action of the pectoral and other muscles passing from the shoulders to the parietes of the chest in deep inspiration is imitated. An inspiratory effort is produced by extending the arms upwards by the sides of the head; on restoring them to their original position by the side of the body, the expanded walls are allowed to resume their previous state, and expiration takes place, the quantity of air expelled being in proportion to that which had been previously inspired. It being necessary to measure the flow of air in and out of the respiratory cavity under conditions of pressure closely resembling those which exist in natural respiration, no means of measurement could be used which, in its working, would offer any appreciable resistance to the passage of air. With this consideration in view, an instrument designed by Dr. Sanderson was employed. (The instrument was exhibited to the Society.)

General results.—1. As regards the volume of air which can be expelled from the thorax by compression of its walls, and inspired by the elastic expansion consequent on relaxation of the pressure, it was found—(*a.*) That pressure by both hands on the lower third of the sternum in the adult male subject usually displaced from eight to ten inches of air. The pressure actually exerted amounted to about thirty pounds. It was, therefore, not greater than might be safely applied to the living subject. The volume of air expelled varied from eight cubic inches to fifteen cubic inches. (*b.*) That pressure made in the same manner on the upper part of the sternum usually displaced two or three cubic inches less than pressure on the lower part. (*c.*) That pressure exerted by one hand on the upper part, by the other hand on the lower part of the sternum, produced about the same results as were observed in *a.* In this case the whole amount of pressure did not exceed that exerted in *a.* (*d.*) That the pressure of a weight laid on the lower third of the sternum produced similar results according to its amount. (*e.*) The lateral pressure exerted on the ribs or costal cartilages of both sides simultaneously was in no instance more effectual. (*f.*) That compression by a broad bandage encircling the chest, the ends of which were crossed over the sternum, and drawn in opposite directions by two persons, produced no greater effect than pressure with the hands on the sternum or sides. 2. As regards the whole amount of exchange of air produced by the method of Dr. Marshall Hall, "to imitate respiration," it varied much, according as the subject was favourable or the contrary; sometimes not exceeding a few cubic inches, but never exceeding fifteen cubic inches. 3. As regards Dr. Silvester's method, it was found that, on extending the arms upwards, a volume of air was inspired into the chest, which varied in different subjects, from nine to forty-four cubic inches, and it was observed that the results obtained in successful experiments on the same body were remarkably uniform, in which respect, as well as in their amount, they contrasted with those obtained by the method of Dr. M. Hall. On restoring the arms to the side, the quantity of air expelled was generally nearly equal to that previously inspired, occasionally less.

In the treatment of apnœa generally, the committee offer the following suggestions: That all obstruction to the passage of air to and from the lungs be at once, so far as is practicable, removed; that the mouth and nostrils, for exam-

ple. be cleansed from all foreign matters or adhering mucus. That in the absence of natural respiration artificial respiration by Dr. Silvester's plan be forthwith employed in the following manner: The body being laid on its back (either on a flat surface, or, better, on a plane inclined a little from the feet upwards), a firm cushion or some similar support should be placed under the shoulders, the head being kept on a line with the trunk. The tongue should be drawn forward so as to project a little from the side of the mouth. Then the arms should be drawn upwards until they nearly meet above the head (the operator grasping them just above the elbows), and then at once lowered and replaced at the side. This should be immediately followed by moderate pressure with both hands upon the lower part of the sternum. This process is to be repeated twelve or fourteen times in the minute. That if no natural respiratory efforts supervene, a dash of hot water (120° Fahr.) or cold water be employed, for the purpose of exciting respiratory efforts. That the temperature of the body be maintained by friction, warm blankets, the warm bath, etc.

In the case of drowning, in addition to the foregoing suggestions, the following plan may be in the first instance practised: Place the body with the face downwards, and hanging a little over the edge of a table, shutter, or board, raised to an angle of about thirty degrees, so that the head may be lower than the feet. Open the mouth and draw the tongue forward. Keep the body in this posture for a few seconds, or a little longer if fluid escapes. The escape of fluid may be assisted by pressing once or twice upon the back. (Signed)—C. J. B. Williams, *Chairman;* W. S. Kirkes, George Harley, J. B. Sanderson, C. E. Brown-Séquard, H. Hyde Salter, E. H. Sieveking, *ex officio;* William S. Savory, *Hon. Sec.*

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13. *Two Cases of Extensive Arterial Obstruction from Separated Cardiac Vegetations, followed by Gangrene and Death.*—Dr. GOODFELLOW read before the Royal Medical and Chirurgical Society (June 24) two cases of this character. The extent to which the plugging took place, the number of vessels involved, the morbid changes in and around the coats of the vessels at the seat of obstruction, and the consequences which ensued, appeared to the author to give a peculiar interest to them. In both cases vegetations of considerable size had formed on the mitral valve and surrounding surface of the endocardium. Some of these had become detached, and caused obstruction to the circulation in several of the large arterial trunks; coagula formed around them, and complete occlusion followed. The symptoms were well marked—namely, pain, intense and agonizing, at the seat of obstruction, and coldness and numbness at the distal extremities of the affected limbs, speedily followed by dry gangrene. In the first case the evidences of occlusion were observed about a month before the fatal event, and about seven days prior to the appearance of gangrene. In the second case the interval between the evidence of obstruction and the appearance of dry gangrene was shorter; the pathological changes in and around the walls of the arteries at the seat of obstruction were less extensive. The first case was that of a woman, aged 30, who had had an attack of acute rheumatism twelve years prior to her admission into the hospital. The heart was damaged during that attack. She, however, was enabled to follow her usual occupation, with occasional interruptions, up to a short period before the appearance of the symptoms denoting obstruction. The second case was that of a girl, aged 17. She had had an attack of acute rheumatism about three years before, complicated with pneumonia, but not with heart affection. Another attack of rheumatism occurred about eighteen months afterwards, which was complicated with endocarditis. From the time of this attack to the period of her seizure with her last fatal illness, she suffered considerably from dyspnœa and frequent and severe pain in the præcordial region.—*Med. Times and Gaz.*, July 5, 1862.

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14. *Epidemic of Typhoid Fever Dependent upon the Use of Impure Water.*—During the autumn of 1860, there prevailed in the convent of the Sisters of Charity, in Munich, an epidemic of abdominal typhus, which was the more remarkable because at that time there were only a very few isolated cases scattered through the town. From the 1st of June till the beginning of September, there

were only two cases of typhoid fever in the convent; but from the 19th of September till the 4th of October, when the population of the convent consisted of a hundred and twenty persons, *thirty-one* of the sisters became rapidly affected, one after the other. Some presented gastric symptoms, others were attacked with regular typhoid fever. Of the fourteen cases of typhoid fever, four proved fatal.

The attention of the medical profession was especially called to this state of matters, because the sanitary state of the town was at that time very satisfactory, and typhoid fever was very rare. It was evident, then, that the cause of this epidemic must be look for in local circumstances; and, after a careful examination, it was discovered that the water, used as drink by the inmates, was mixed with substances in a state of putrefaction, and that it constituted the cause of the epidemic. The local circumstances were the following: The convent is situated beside the general hospital. In the spring of 1860, a well was dug in the latter, having a depth of twenty feet. This well was distant only two feet from the laundry in which the clothes of the patients were washed, and was surrounded by the openings of five drains, intended to absorb the water which ran off from the laundry, and connected with one another by gutters, from which the water was insensibly filtered into the surrounding soil. This water was turbid, had a disagreeable odour, and contained an abundant sediment. As the drains were only twenty or thirty feet from the well, the water in the latter was contaminated by that in the drains. To demonstrate this fact, the contents of the drains and the water of the well were submitted to a careful microscopic examination by Dr. Hessling, a skilful microscopist. He found, in the sediment of the water from the drains, various kinds of matter, of animal and vegetable origin, in a state of decomposition: some could still be recognized by their original forms, but the greater part constituted only a mass of detritus. This detritus was in the form of a flaky coagulum of a dark-green colour, forming little masses, some of which contained inorganic matters, such as sand, particles of lime, etc., which seemed to have constituted the nuclei. Both the water and the sediment contained a large quantity of carbonate of lime, and on the addition of a little sulphuric acid, a strong odour, resembling that of rotten eggs, was disengaged; the same phenomena took place even with the small objects which were submitted to microscopic examination. In addition, there were observed organic elements of new formation, such as algæ, spores, vibriones, and monades, which moved rapidly about in the field of vision. The water from the well deposited no sediment; nevertheless, on examining it microscopically, the same elements were observed as in the water coming from the drains, but in a very diluted state, especially as concerns the flaky coagula, the spores, and the vibriones.

It was consequently demonstrated that the water of the well had been contaminated by the contents of the drain. Professor Pettenkoffer, who made a chemical analysis of the water of the well, discovered in it a much larger quantity of organic matters, of lime, and of nitrates, than is contained in ordinary drinking water.

The water of the new well habitually supplied the requirements of the laundry. Between the 17th and 28th September, the time when the epidemic commenced, the water was conducted by pipes into the bath-room and kitchen of the hospital and convent, because, as repairs were being carried on in the bath-room, these establishments no longer received a sufficient supply of water. It was recommended that this water should only be employed for baths, for washing, and for the kitchen, and that the water which was to be used for drinking should be furnished from two wells situated in a court intermediate between the hospital and the convent. Nevertheless, although the attendants in the convent had been sufficiently warned, it appeared, after a careful investigation, that the water which was carried in the evening from the kitchen into the bedrooms of the sisters to be used for the toilette, had been also used for drinking; and all the persons who became ill, acknowledged that they had drunk this water.

If it be considered that the epidemic commenced at the very time when this water, which contained putrefying organic matters coming from the dirty linen of the patients, began to be drunk, we are authorized in concluding that the

cause of the typhoid affection existed in the poisonous properties of the water—a conclusion which is still farther justified by the fact that the epidemic ceased as soon as the water in question ceased to be employed for drinking.—*Edinb. Med. Journal*, June, 1862, from *Nederlandsch Tijdschrift voor Geneeskunde.*

15. *Diabetes with Spinal Irritation.* By Dr. E. A. KUNKLER.—The subject of this case, was a man, 26 years of age, who had been the subject of diabetes for seven months. Notwithstanding the use of morphia, iron, bitters, exclusively animal diet, &c., he got worse; the emaciation, thirst, want of sleep, frequent epistaxis being excessive. After consulting numerous physicians without benefit, the relater of the case, bearing in mind the hypothesis of Scharlan, that the origin of the disease was to be found in the vertebral column; and the discovery by Bernard, that irritation of the fourth ventricle of the brain caused the appearance of sugar in the urine and blood, thus connecting the disease with some derangement of the nervous system; and moreover finding that in this case the superior part of the dorsal portion of the spine was tender at many points, applied a certain number of cupping-glasses. Their application was followed by a disappearance of this morbid sensibility, but there was no abatement of the disease itself. Immediately, however, after a blister upon the neck, the presence of sugar and the unusual excretion of the urine ceased most unexpectedly, as if by enchantment. A slightly disagreeable sensation, which hitherto the patient had experienced at the lower part of the brain, also ceased at once. After continuing for ten or twelve days blisters upon the neck and behind the ears alternately, the affection had entirely and permanently disappeared, and this in spite of a varied diet.

The particulars of the above case were sent to M. Bernard, with the hope that as Paris offered more cases of diabetes than the locality where Dr. Kunkler lived (Placerville, California), he would give the plan of treatment an extended trial.

The quoter of the case in *L'Union Médicale* recalls to notice the recital by Becquerel of an instance in which glucosuria occurred in a case of acute myelitis, and in a case of spinal meningitis with tumour of the pia mater and softening and cyst of the cerebellum; also by Lebert, of diabetes in a hemorrhagic affection of the spinal cord; and by Scharlan, of the post-mortem examination of two cases of diabetes, in which softening of the cord, with other changes, were found. He wisely suggests that the cure of diabetes by the means above related, must not always be looked for, inasmuch as although generally being developed under the influence of the nervous system, its modes of origin are very various.—*B. and F. Med-Chir. Rev.*, July, 1862, from *L'Union Méd.*, July 29, 1861.

16. *Diphtheria and its Sequelæ.*—Dr. JAMES BEGBIE has published (*Edinb. Med. Journ.*, May, 1862) some interesting observations on diphtheria. His cases tend to confirm the views generally entertained in regard to the nature of diphtheria, and go to establish:—

1st. That it is a constitutional disorder having the character of fever, running a definite course, and bearing a closer affinity to scarlatina and typhoid fever than to any other specific disease.

2d. That its local manifestation is chiefly observed on the mucous membrane of the mouth and throat; the tonsils, uvula, and palate with the pharynx being first affected; but that it has a tendency to spread to the adjoining passages, and is particularly prone to invade the larynx.

3d. That this local disease is of the nature of inflammation of asthenic character, with exudation of lymph in the form of pellicle.

4th. That the disease is contagious, and that youth and consanguinity powerfully predispose to it.

5th. That it is fatal from the severity of the general disorder, or from the exudative inflammation invading the larynx, and causing suffocation; or that death may result from the nervous disorder supervening in the form of paralysis.

And, lastly, that as we have no specific remedy for diphtheria, the disease and its sequels must be treated on the general principles which regulate our practice in fever and in inflammation, and in nervous disorders of asthenic character.

17. *Influence of Temperature on Yellow Fever.*—Dr. ARCHIBALD SMITH (for many years resident in Peru) stated at a late meeting (June 2) of the Epidemiological Society, that he had noted all the essential symptoms of yellow fever at an elevation of 11,250 feet, with a temperature in the wet season of 62° within doors, with little variation day and night. At this temperature the disease lost none of its energy. In 1853 yellow fever appeared simultaneously on both sides of the Andes, and in 1854 assumed its most malignant character as well by the seaboard as on the hill-land. It was shown that these epidemics were of one generic nature. The yellow fever symptoms became modified gradually into the typhous or typhus, in the transit from the Pacific shores to higher and still higher regions of the Andes. In the warmer inland valley, as, *e. g.*, in the sugar-growing district of Abancay, the fever, which near the snows of the Cordilleras was metamorphosed from the typhus-icterodes of the coast into a form which, in a great measure, represented ordinary British typhus, was again reinstated with its most aggravated coast symptoms of yellow fever, such as intense frontal headache, dark sanguineous vomiting or evacuations, subcutaneous hemorrhage in form of large, dark maculæ, nasal hemorrhage, intense yellow colour of the skin, and the most extreme prostration of vital forces. In the Sierra it was propagated slowly from place to place, and from person to person. It was all but incurable in the dark and crowded huts, but yielded readily in a great majority of cases to early treatment, under the advantages of pure air and hygiene. Left to itself in the hovels of the Indian poor, it was prodigiously fatal.—*Med. Times and Gaz.*, July 19, 1862.

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18. *Clinical Researches upon Auscultation of the Head.* By HENRY ROGER, M. D., Prof. Fac. Med. Paris.—It is well known that the first application of the discovery of Laennec to the diagnosis of diseases of the brain was made by Dr. Fisher, of Boston. In 1833 this physician communicated to a learned society a memoir upon the *cephalic bellows sound*, and transmitted his interesting researches to the *American Journal of Medical Science*, Aug. 1838. "Auscultation," said Dr. Fisher, "may be as useful in the symptomatology of affections of the brain as it is in those of the chest, and may furnish a pathognomonic sign of these diseases."

After having traced the rules of cerebral auscultation, and indicated the normal sounds which reach the ear when applied to the head, and having distinguished those which come from the nasal fossæ, and which belong to respiration and phonation, as well as those which proceed from deglutition and from the head itself; after having distinguished all these from abnormal sounds, Dr. Fisher considers the *cephalic souffle* in diseases of the encephalon. He mentions, among other affections of which an abnormal bruit is one of the symptoms, *chronic hydrocephalus, cerebral congestion*, either simple or resulting from disordered dentition or hooping-cough, *acute inflammation of the encephalon or its membranes, abscess* of the brain and *induration* of that organ.

Dr. Whitney went even further than his colleague in his opinions with regard to the symptomatological value of the cephalic souffle (*American Journal of Medical Science*, Oct. 1843). To the affections mentioned by Dr. Fisher—cerebral congestion, meningitis, &c., in which the stethoscopic phenomena were present, he adds scirrhous transformation of the cerebellum, and mechanical compression of the brain. He says, moreover, that he perceived a *cerebral ægophony* in hydrocephalus, a bruit similar to the *catarrhal fremitus* in aneurism of the arteries at the base of the brain, and finally he points (and with reason, in certain cases) to the existence of a *cephalic souffle* in *anæmia of the brain* and also in *chlorosis*.

Notwithstanding the labours of these two American authorities, each of whom confirmed the observations made by the other, and in spite of results which generally agree, and which seem to have the testimony of numbers—for the facts in their memoirs count by hundreds—cerebral auscultation, which promised to throw an unexpected light upon a very obscure point in pathology, met with but little favour. The European medical journals confined themselves to incomplete analyses and short extracts: while but few practitioners thought it their duty to repeat the experiments necessary for a criticism of the facts which had

been stated by our American brethren, as if they mistrusted a discovery coming from such a distance.

In the year 1841, in the first edition of the *Traité Pratique d'Auscultation*, mention was made of the observations of Drs. Fisher and Whitney; but the experiments to which M. Barth and I devoted ourselves for testing their truth, though certainly not very numerous, only gave us negative results. After having searched in vain to discover a cephalic souffle in certain cerebral affections, and having been unable, in twelve or fifteen cases of meningitis, to hear any such, while the American doctors declared it to be present in all; strengthened besides in our scepticism by the silence maintained by MM. Andral and Bouillaud upon auscultation of the head, and by the equally negative observations of MM. Fournet and Vernois, in nine or ten cases of meningitis, and of Professor Piorry,[1] we thought it right at that time, and in subsequent editions of our work, to express doubts of this new application of the stethoscope, and were led to dispute, if not the reality, at least the importance of auscultation of the brain.

Still I always regretted this summary condemnation of the undoubtedly conscientious labours of two professional brethren. That results stated in America as certain should be absolutely and generally denied in Europe seemed not a little extraordinary; and we must either suspect the mode in which the physicians on the other side the Atlantic made their observations, or confess that in this hemisphere we were deaf to sounds distinctly heard in the other. Shall we say with Harvey's adversary, the old Venetian physician, "*quem nos surdastri audire non possumus*"—"in Europe people are deaf; they only hear that in America '*tantum modo in America exauditur.*'"

As the only means of deciding the question was by making more minute clinical observations, I devoted myself patiently to this difficult task, and began afresh the study of cerebral auscultation. My researches were almost exclusively among children,[2] because it is chiefly among them, when at the breast, that Drs. Fisher and Whitney said they heard the stethoscopic phenomena, the discovery of which they announced; and because the difficulty of diagnosing diseases of the brain is greater in childhood than in later life, a greater interest belongs to the progress which symptomatology would make in this department. I may add in passing that it is only among children, whether subject or not to cerebral disease, that auscultation of the brain is likely to be of use; for beyond a certain age, or beyond a certain period of early childhood, the most practised ear applied to the cranium cannot detect morbid cephalic bruits.

Since I began collecting the observations which form the subject of this memoir, several authors have been similarly engaged in cerebral auscultation, among others MM. Rilliet and Barthez, and M. Hennig, head of the Children's Hospital at Leipsic. The first, in their admirable work (2d edit., vol. ii. pp. 158–9), make some remarks on the cephalic souffle in cases of hydrocephalus and in rachitis; I shall have occasion to quote the passage where they speak of this bruit under the head of the diagnosis of these affections. The German author has written a monograph upon this subject, and in a pamphlet of not less than thirty pages (*Archiv für physiologische Heilkunde*. Stuttgart, Août 1856) he reproduces, with annotations and additions, the inaugural thesis of Dr. Wirthgen (*De strepitu qui in capite auscultando auditur*, Leipsic, 1855), which, indeed, appears to owe its birth to him, and in which he successively studies the normal and abnormal bruits discovered by cerebral auscultation, the seat of those bruits, the age at which they are heard, their physiology and pathology, and especially the mechanism of their formation, and from these he deduces the results which the physician may expect to find in practice. I had completely devoted myself to this study before I became acquainted with the researches of M. Hennig, and we shall see, by the details of my observations, how far my conclusions agree with his.

Perhaps the admirable work of the Leipsic physician is faulty from a want of method and perspicuity, of which French readers complain greatly in the writ-

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[1] Traité de pathologie iatrique, tom. viii. p. 353.

[2] I have never been able to detect any cephalic bruit among adults, either in apoplectic patients or young chloro-anæmic females.

ings of the learned German author. M. Hennig does not give with sufficient clearness the details from which he drew his deductions, nor his mode of proceeding in collecting facts; the number of cases from which he decides (and they do not appear to be very numerous) are not indicated with precision; all this necessarily diminishes the value of his statements.

In order that I may not incur the reproach just cast upon the German author, I may say that the conclusions which are recorded in this paper were drawn from an examination and comparison of a very considerable number of observations, their total being nearly 300; at first they were gathered from cases selected among children whom I thought were affected with cerebral disease, or who were the subjects of rickets; then (having determined the existence of a cephalic souffle among children of healthy appearance) I afterwards examined all cases indiscriminately, whether in the wards of the Hospice des Nouveaux Nés, the Hôpital des Enfants, or in private practice.

Plan of the Memoir.—Having made these preliminary observations, we come now to the study of facts, and after having traced out the *rules* which facilitate auscultation of the head, I shall point out what *physiological bruits* the ear discovers when applied to the cranium; and in a third chapter, the longest and most important, *morbid bruits* will be specially considered.

Section I. *Rules for Cerebral Auscultation.*—When a patient is submitted to stethoscopic examination the most convenient position is the horizontal, with the head placed upon a pillow slightly raised; this may be inclined to different sides, according as it is desirable to examine the occipital, frontal, or temporal regions, &c.

In examining an infant at the breast, it should be seated on the knee of its mother or nurse, and the head should, if possible, be held steadily, either by the hands placed softly on either side, or by leaning it against the mother's breast. If the patient be in a comatose condition from some cerebral affection, auscultation will be easily performed. It becomes difficult when the child cries or moves about, which is usually the case; we must then try to quiet it by suckling and auscult it while it is at the breast, the bruit of deglutition being no obstacle to the recognition of morbid cephalic bruits.

If the examination be impossible while awake, it must be abandoned till an attempf can be made in quieter moments, or we may make the attempt during sleep, which is generally sufficiently profound not to be disturbed by the examination of a physician.

The auscultation may be either *direct* or *indirect.* Dr. Fisher found the latter the most convenient, the ear adapting itself exactly to the rounded or projecting surface of the cranium. Care must be taken to prevent the rustling of the hair; also, as a matter of cleanliness, the child's head should be previously covered with a napkin, which may serve at the same time to keep it more firm. Auscultation, practised thus directly, possesses some advantages; whatever may be the cries or agitation of the little patient, one always finds, in applying the ear quickly and somewhat firmly to the middle of the anterior fontanelle, that we catch, so to say, the sound of a cephalic souffle. But when the child is asleep, or when it is willing to remain quiet, mediate auscultation is preferable; it allows the detection of the bruits with greater precision and exactness, and we may also isolate them, so that those which are natural are not confounded with those which are abnormal.

For this purpose the ordinary stethoscope, which has been generally substituted for the primitive cylinder of Laennec,[1] answers perfectly; held as a pen in writing, it should be applied over the different regions of the cranium, and be kept fixed in the same way as for auscultations of the vessels of the neck. M. Hennig recommends the employment of a flexible stethoscope, twenty-three centimetres long, having for its middle portion a tube of vulcanized India-rubber. This stethoscope is certainly preferable, for with it we can easily follow the movements of the child during the examination.

On what regions of the head should the instrument be applied in order the better to detect the physical phenomena? If Drs. Fisher and Whitney are cor-

[1] Traité Pratique d'Auscultation, cinquième edition, p. 19.

rect, the bruit of the cephalic souffle is so evident that it suffices to apply the ear to any part of the cranium in order to discover it immediately; but our experience does not bear out this assertion. It may be true that the bruits of nasal respiration, and of deglutition, are perceptible over nearly the whole surface of the head, but this is certainly not the case with the genuine cephalic souffle, which we have most frequently heard in the region of the anterior fontanelle, and still more plainly when we auscult directly over the fontanelle itself. It gradually diminishes in intensity the further we remove from that point, which appears to be the centre whence the bruit starts; then gradually becoming more feeble along the parietal or frontal sutures, it is completely lost further away, the finest ear failing to discover any sound over the lateral surfaces of the cranium and the occipital protuberances.

The physician who cannot count for long on the docility of his little patient would do well, if he wishes to detect the cephalic bruit, at once to place his stethoscope on the summit of the cranium over the depression corresponding to the anterior fontanelle; it is there, as we have said, that the abnormal bruit exists in its greatest intensity, and the examiner, if he does not detect it at that point, may dispense with any further investigation.

SECTION II. *Physiological Bruits.*—When we practice auscultation on the top of the head of a healthy subject, different bruits are heard.[1]

I. One is produced by the circulation of the air in the nasal fossæ; this is the *cephalic bruit of respiration* mentioned by Dr. Fisher; it is very intense and harsh, and analogous to the laryngeal respiratory murmur; it coincides with the respiratory movements, increasing in strength and frequency when these are accelerated.

These characters are sufficient to distinguish it from other cephalic bruits; but in some cases of extreme dyspnœa the nasal respiratory bruit is so frequent and quick that it might easily be mistaken for the cerebral vascular souffle of which we have just spoken, and the two phenomena might be confounded were it not for the close relation which the first bears to the movements of the thorax.

When the pituitary membrane is thickened or there is much secretion of mucus, the respiratory cephalic bruit is transformed into a sibilant rhonchus, or into a kind of coarse crepitation; the same physical conditions of the mucous membrane exist as in bronchitis, and consequently the same râles are heard.

Nor is this all; in affections of the larynx, the bruits caused by the passage of the air along the laryngo-tracheal tube are much drier and more or less prolonged, extending above into the nasal fossæ as well as into the bronchial tubes below, and the rhonchus or laryngeal hissing (similar to the bronchial râles) everywhere heard is more perceptible in auscultation of the head than it is in that of the chest.

With regard to the râles formed in the lungs, these are not heard from so great a distance, and they escape stethoscopic examination when practised on the head: in the very exceptional case of a young phthisical girl I was able to detect, by cerebral auscultation, a loud gurgling which was produced in a cavity in the subclavicular region.

II. If the child speaks or cries the *vocal sounds* are heard very distinctly, and the ear, when applied to different parts of the cranium, perceives a very remarkable resonance; this *cephalic resonance* may be compared to that which is heard so loudly in the larynx, it has a nasal timbre which varies in different individuals, it is always very piercing, the voice seeming to proceed from the cranium.

III. Placing the stethoscope on the head, another peculiar bruit may be heard, that of deglutition; in new-born infants there is also that of suction. This bruit is so singular and so readily recognized that there is no need to describe it. We hear it more distinctly by direct than indirect auscultation, and in cases where the nurse appears to have but little milk, and when consequently the child makes

[1] In treating here of *auscultation of the head*, I shall not consider *aneurisms* of the larger arteries of the brain nor *diseases of the ear* (see the work of M. Gendrin and an admirable article by M. Ménièr, in the *Traité pratique d'Auscultation*, 5th edit. p. 562.)

frequent efforts at suction without our being able to decide the fact of its having swallowed anything, we may be able to determine this by cerebral auscultation, the bruit of deglutition comes very strongly upon the ear, and we are therefore better able to appreciate the quantity of milk supplied and swallowed.

Such are the *extrinsic bruits* revealed by cerebral auscultation; moreover, it is not impossible to a practised ear to hear in some subjects, especially in cases of palpitation, the two sounds of the heart propagated from the solid walls of the cardiac region up to the head. In forty-two healthy infants five times I was able with attention and patience to perceive the tic-tac of the heart in auscultating over the cranium. In another case, I have been able to hear a strong bellows-sound originating in the left auriculo-ventricular orifice; but this last case was exceptional. More frequently the cardiac sounds themselves escape observation in auscultation of the brain; and we may, for greater simplicity in studying the subject, omit the *cardiac cephalic bruit*, at least as it has been described by Drs. Fisher and Whitney.

With much greater reason we shall contest the possibility of recognizing with the ear the modifications which so-called cerebral diseases create: for example, Dr. Fisher says he is able to discover in almost every case (thanks to his aptitude for cerebral auscultation), the impulsive character of the pulsation which he supposes to belong to apoplexy. These, however, are minutiæ of such exceptional cases (*rara non sunt artis*), and tend only to embarrass without enriching semeiology.

IV. Are we, then, to include in the physiology of this subject an *intrinsic bruit*, the *cephalic souffle*, an essentially pathological phenomenon?

On this point, those authors who have specially directed their attention to auscultation of the brain are far from being agreed. With the American observers, the souffle is always abnormal, it is never a healthy phenomenon. Dr. Fisher expressly says, "it depends always upon some cerebral affection." Dr. Whitney equally insists upon the proposition, that auscultation never reveals anything like a cephalic souffle in the normal condition.

M. Hennig, on the other hand, believes that the souffle belongs rather to a state of health;[1] and, further, this bruit, which according to the American doctors would be much more manifest as the cerebral affection became more marked, would, according to the Leipsic physician, sometimes disappear in sick children, to reappear with returning health.

If we seek among our own facts whether the American or German authors are right, the first declaring that in the normal state the cephalic souffle is never heard, and the second being of opinion that it is always heard; we incline to believe that both are equally wrong, and that these two exclusive opinions are alike to be condemned.—*London Med. Rev.*, July, 1862.

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19. *On the Transmission of Syphilis by Vaccination.*—The very interesting remarks which follow are from a clinical lecture delivered by M. Ricord, at the request of M. Trousseau, in the Hôtel Dieu, at Paris. They start from a case then in the hospital: they end with an opinion upon the notorious case at Rivolta, in which syphilis broke out in forty-six infants three weeks after vaccination.

A young woman, aged eighteen, was admitted on the 6th of December last into the wards of the Hôtel Dieu, for the treatment of catarrhal metritis and granulating ulceration of the cervix. *No syphilitic precedent whatever* could be traced in her history. An epidemic of smallpox having broken out while she was in the hospital, all the patients liable to contagion were repeatedly vaccinated. Although the girl presented unmistakable marks of previous successful vaccination, she also underwent the operation. The lymph was sup-

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[1] So we gather from several rather confused passages in his Memoir where cephalic bruits are considered. "We have heard these bruits (M. H. does not say which) on the head from the twentieth week to the sixth year. . . . These bruits have been present in healthy children at the twenty-third week." (*Loco cit.* p. 413.) "The souffle or hissing which is present in *healthy* children." (*Ibid.* p. 415.) "These bruits are sometimes wanting in sick children, but reappear with convalescence." (*Ibid.* p. 413.)

plied by a healthy infant, born in the wards, and vaccinated a few days before with the virus distributed at the Academy of Medicine; three punctures were made in each arm. Three children were also inoculated with the matter taken from the same infant, and in all four the pustules were developed in the most regular manner. In the young woman, on the contrary, the vaccine did not take; this was fully expected. She left the hospital, and was lost sight of for a fortnight, when she returned to the Hôtel Dieu, complaining of pain in one arm. On examination of the part two pustules of ecthyma were found occupying the seat of two punctures. These were at first referred to a somewhat tardy evolution of the vaccination, and perhaps to accidental friction. But the pustules, deemed insignificant at first, gradually became larger and hard at the base; cervical and axillary adenitis set in, and, after an interval of five or six weeks, a roseate eruption broke out over the entire body.

From the beginning, M. Trousseau strongly suspected the syphilitic nature of the symptoms, but he was desirous of obtaining the opinion of M. Ricord, who fully confirmed his conjecture.

It is an unquestionable fact, said this last-named physician, that this patient bears on her arm a most distinct primary sore, *an indurated and infecting chancre*, characterized by an indolent, convex tumour, ulcerated at the point (*ulcus elevatum*), suppurating moderately, and supported on a broad, elastic base, well limited at its margin, surrounded by uninflamed textures, and, as it were, implanted in the healthy tissues. The present tumour is a fair specimen of the infecting chancre in a state of transition towards the secondary stage, and assuming the aspect of the mucous papula. Consider, in addition, the other phenomena which have followed each other in rapid and regular succession, the glandular enlargements of the axilla and neck, the headache and roseola, and you cannot doubt but that the case before you is an unmistakable instance of genuine secondary syphilis.

With regard to the origin of the disease, it is obvious that the punctures in the arm have been the portals through which it has entered the system; but it is by no means so clear that the poison was introduced into these wounds together with the vaccine-lymph.

M. Ricord does not reject this mode of propagation as absolutely impossible. But in the estimation of facts which seem to establish such transmission, it is necessary, said he, to distrust the evidence of our senses. It is only by taking into account the obscurity which must necessarily surround a pathogenic interpretation of an usually retrospective character, and carefully guarding against the errors that a superficial observation may give rise to, that we can hope to discover the solution of so important and intricate a problem. We have now entered, he continued, upon a period of reaction against hitherto accepted doctrines, and if we do not take care, we will be almost inclined to pronounce a man to be affected with syphilis if he has ventured, without an umbrella, in some of the less reputable streets of this capital. M. Ricord then treated of the contagiousness of constitutional syphilis, and ascribed it in most instances to the infectious character retained by chancres, *undergoing transformation* into secondary symptoms, or by *mucous papulæ*, the earliest manifestation of the general poisoning of the system, whether developed *in situ* by a metamorphic change of the primary sore, or at a distance from the seat occupied by the latter. However this may be, M. Ricord contends that the instances of propagation of syphilis by the contagion of secondary symptoms, are far more unfrequent than some authors have asserted. Syphilis is widely diffused, and were the contagion of its constitutional manifestations as easy as has been affirmed, the nineteenth century would far outrival the fifteenth.

There may be perhaps some other vehicles of contagion besides the secretion of chancre, and sometimes of a secondary sore; this at least is not impossible, but is not susceptible of peremptory demonstration in the present state of our knowledge. An erroneous and hasty interpretation of obscure facts, in which the true filiation of the symptoms has eluded detection, is, in M. Ricord's opinion, at the bottom of all the mistaken theories and wandering speculations propounded on the subject. Thus, some men may escape infection though they have communicated with a woman affected with chancre, and others may be

poisoned by one who herself is sound. Such cases are, of course, not obviously intelligible at first, but the obscurity is easily cleared away by the now well-known history of *mediate contagion*, by which we are taught that healthy females, who after intercourse with diseased men are approached by persons in sound condition, may transmit from the former to the latter the virus, themselves escaping scatheless. M. Ricord here related several very curious instances which illustrate and confirm in the most distinct manner the doctrine so perspicuously laid down by M. Cullerier. On the other hand, it is unnecessary to expatiate on the innumerable modes of conveyance of the virus from one person to another. Every possible contact, every imaginable form of communication, may generate chancre. M. Ricord once attended a magistrate affected with indurated chancre of the eyelid, periauricular bubo, and secondary roseola. The organs of generation were perfectly sound, but the patient acknowledged that his hands had wandered into dangerous precincts, and that in rubbing his eyes he had inoculated the virus into the eyelid. Is it entirely impossible that something of the same kind may have happened in M. Trousseau's patient? She was lost sight of for a fortnight; the punctures in the arm induced some local uneasiness, which she doubtless endeavoured to allay by scratching with her hand. Now, who will say that that hand has constantly remained pure, or that the arm may not have been exposed to any other suspicious contact? These are some of the points which ought to be cleared up before vaccination can, with any show of reason, be assumed to have caused the chancres observed in this instance.

The possible transmission of syphilis by the inoculation of the blood of persons tainted with the virus has, however, been for some time before the public, and derives considerable additional importance from the results recorded by M. Viennois. In this memoir the author agrees with M. Rollet, that syphilis is not transmitted by vaccine-lymph, but by the admixture of the latter with blood. In a recent vaccination, which caused considerable sensation beyond the Alps, it has likewise been contended, in order to account for the propagation of syphilis, that blood oozed out, together with lymph, from the pustules of the child who supplied the matter, and that the lancet of the operator was therefore charged with a mixed fluid of deleterious nature.

M. Ricord, while admitting the truth of these facts, rejects the interpretation which has been offered.

It is a remarkable circumstance, said he, that as soon as the generating poison of syphilis has penetrated into the system, it is fundamentally modified. It becomes undiscoverable to chemical analysis, or to microscopic research, and utterly loses its distinguishing character of reproducing a pustule similar to that in which it was originally generated. Were it otherwise, in a person tainted with syphilis, the most trifling wound would be liable to assume the aspect of chancre, from contact with the blood escaping from the lacerated vessels. Nothing of the kind is ever observed. M. Ricord has performed operations on many individuals suffering from constitutional syphilis, and he never noticed, even in a single instance, anything particular in the aspect, progress, or duration of the wounds.

It will, perhaps, be alleged, that experiments have been instituted, which seem to point to the possibility of the transmission of syphilis by the blood of diseased subjects. Thus, M. Waller, after scarifying the thigh of a patient, dressed the wounds with lint impregnated with syphilitic blood; the part healed, but about three weeks afterwards pustules appeared on the thigh. The fact is true, says M. Ricord; but it is proper also to add, that *at the same time* a similar pustule was developed on the shoulder. This chancre had, doubtless, the same origin as the others, and entirely invalidates the case. At Lyons, analogous experiments yielded conflicting results. Finally, M. Lalagade, the head surgeon of the Hospital of Albi, who never had been affected with syphilis, *publicly* inoculated in his own arm the blood of three soldiers manifestly suffering from this complaint; and although, on each occasion, two wide and deep punctures were performed, the results were entirely negative.

As to those sad instances of vaccination published in Germany, in France, and in Italy, M. Ricord does not deny their accuracy; they assuredly deserve consideration, but cannot be received as conclusive in the question, until all their

attendant circumstances have been minutely weighed, and the reciprocal operation of cause and effect has been carefully inquired into. M. Ricord declared that he gave his full approbation to the conclusions of a paper, published in the *Gazette Hebdomadaire*, by M. Jaccoud, on the distressing occurrences observed during the course of the last year in the province of Acqui.

M. Jaccoud, after reminding his readers that at the end of the month of May, 1861, syphilis broke out, three weeks after vaccination, in forty-six infants at Rivalta, proceeds to state that an inquest was held as to the cause of the calamity; and that, despite the apparent clearness of the facts, the committee appointed to investigate the matter declined to pronounce on the alleged connection between syphilis and vaccination, and declared that, in order to form their judgment, further inquiry was necessary. He continues thus:—

"These gentlemen were both prudent and wise. Before admitting that syphilis in this instance was transmitted with the vaccine matter, many difficulties and obscurities have to be cleared away; it would further be necessary to solve several important questions, which at present it appears impossible to reply to. For our own part, an attentive perusal of the documents of the case has led us to the same conclusion as Dr. Albertetti, who exonerates from all blame the vaccinations in question. The events of Rivalta present to our view two conspicuous, but wholly distinct facts—viz., the vaccination of the infants, and the subsequent appearance of syphilis in certain of their number. It is granted that these two orders of facts occurred in succession, but for the present we are not prepared to go any further, and to argue, *post hoc ergo propter hoc;* the coincidence is obvious, not so the inference of causality. Whatever interpretation be adopted as to these facts, they convey a useful caution, and illustrate in an eloquent manner the necessity of taking into account the manifold elements in the ætiological history of vaccinal syphilis, and the extreme reserve required of the physician in cases of this description."

"This view," said M. Ricord, "is in such perfect harmony with mine, that I have nothing to add to M. Jaccoud's remarks. Let us admit, and carefully inquire into, these cases, and let us guard against any predetermined notions on the subject; but as to the interpretation offered, let it be received with an amount of hesitation and doubt, increased by the obvious fact, that if ever the transmission of syphilis with vaccine-lymph is clearly demonstrated, vaccination must be altogether discontinued, for, in the present state of science, we are in possession of no criterion which may permit the conscientious practitioner to assert that the lymph he inoculates is perfectly free from admixture with blood tainted by syphilis."—*Ranking and Radcliffe's Half-Yearly Abstract*, vol. xxxv., 1862.

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20. *Treatment of Agues by Cinchoniæ Disulphas.*—Mr. H. R. OSWALD states (*Madras Quarterly Journ. Med. Sci.*, Oct. 1861), that he has been prescribing the cinchoniæ disulphas in the Shemooga Hospital since 1857, up to the present date; during this period 4,985 cases of fever, of all types, have been treated, so that he has had numerous opportunities for testing its virtues, and his experience has led him to form a high opinion of its powers as an antiperiodic. Intermittent fever, as seen there, though not often fatal, is in many cases very severe; the ague especially is prolonged, and enlargement of the spleen frequently met with, even in children of the tenderest years; showing the truly malarious origin of the disease. "With this field for observation," says Dr. O., "I may state that I am inclined to place cinchonine almost on a par with quinine; in some cases it fails, but not often. Doctor Kirkpatrick observes, the dose required to check an attack of ague is about the same as that of quinine, but I do not quite coincide with this, as I have generally found a rather larger quantity necessary.

"I have not tried the combination of quinine and cinchoniæ disulphas, as in cases where the latter has failed I have at once had recourse to the former.

"Royle states that 'Dr. Pereira and others consider it equal in medicinal activity to the quinæ disulphas.' Dr. Waring says, 'its action is similar to that of quinine, but it is less energetic, and consequently requires to be given in larger doses.' Many cases in which it has been given might be adduced, but, as they would occupy valuable space, it may be sufficient perhaps to mention, that since its first employment by me, no less than 4 lbs. 10 oz., have been ex-

pended in addition to quinine and bark, showing the estimation in which it is held. In fact it is now in daily and constant use, and is as regularly indented for as any other drug.

"For some time past, however, I have observed that the administration of the cinchoniæ disulphas is attended with certain physiological effects, which will probably prevent it from ever being substituted for quinine under all circumstances. Dr. Kirkpatrick has mentioned that nausea and vomiting attend the use of large doses, such as 15, 20 and 30 grains. I have, however, found that nausea sometimes attends even 5 grain doses, and this is frequently accompanied by giddiness, dryness, and constriction of the fauces, and sometimes purging with pain in the abdomen. I observed some of these symptoms in my own person after a 10 grain dose taken to check an attack of fever, and the same remark has been volunteered to me by natives who have taken it: they pass off in a few hours; as long as they last, however, they are very disagreeable, as I can testify from personal experience.

"After a time there is apparently a 'tolerance' of the remedy, and these unpleasant symptoms are not perceived; in long-continued doses the effect is similar to that produced by quinine.

"I think then with these disadvantages the remedy is never likely to supersede quinine, except where economy is a consideration. When this is the case, I have no doubt that the cinchoniæ disulphas may be substituted for quinine in the treatment of simple uncomplicated intermittents with equal safety and benefit."

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21. *On the Treatment of Pneumonia: with the Results of One Hundred and Five carefully recorded Cases.*—At the late meeting of the British Medical Association in London Dr. J. Hughes Bennett, of Edinburgh, read an interesting paper under the above title.

By pneumonia, or inflammation of the lung, the author stated he understood a disorder essentially composed of an exudation from the blood among the elementary textures and into the air-vesicles of that organ, which gives rise to those well-known physical signs and functional symptoms with which all are familiar. This, like most other inflammations, when acute, was formerly treated by so-called antiphlogistics—that is to say, bloodletting, purgatives, antimonials, low diet, and other methods of lowering the strength of the patient. It was about eighteen years ago, in consequence of investigating the pathology of inflammation, that Dr. Bennett began to doubt the propriety of such a treatment, and this for the following reasons:—

In the first place, the cause of the inflammation is an irritation of the textures, of the ultimate molecules, of the part; in consequence of which their vital power of selection is destroyed and that of their attraction is increased. The removal of blood by venesection cannot alter this state of matters, neither can other lowering remedies. If the inflammation be superficial and limited, local bleeding may diminish the congestion, as in conjunctivitis; but if exudation has occurred, it cannot remove that.

In the second place, an exudation or true inflammation having occurred, it can only be absorbed by undergoing cell-transformation. Now this demands vital force or strength, and is arrested by weakness. Inflammations in healthy men rapidly go through their natural progress. In weak persons they are delayed or arrested: hence their fatality.

In the third place, the strong pulse, fever, and increased flow of blood in the neighbourhood of inflamed parts, have been wrongly interpreted by practitioners. They are the results, and not the causes, of inflammation; and show that the economy is actively at work repairing the injury. So far, therefore, from being interfered with and interrupted, they should be supported by nutrients.

It follows, fourthly, that if these views be correct, the true treatment of inflammation should be directed towards bringing the disease to a favourable conclusion by supporting, rather than by diminishing, the vital strength of the economy; and this, not by over-stimulation, as was done by Dr. Todd, but simply by attending to all those circumstances which restore the nutritive processes to a healthy condition.

Having been guided by these views in his practice for the last fourteen years, and having seen that they have been gradually adopted by the profession, Dr. Bennett offered the most convincing proof of their correctness from an analysis of 105 cases of pneumonia publicly treated in his clinical wards in the Royal Infirmary of Edinburgh, and carefully recorded by his various clinical clerks. In all these cases the treatment was directed to the support of the economy, never to weaken it by antiphlogistics. At the same time, if dyspnœa be urgent, cupping or a small bleeding (from four to eight ounces) may be practised as a palliative, more especially in bronchial or cardiac complication—although in none of these cases was such bleeding ever found necessary by him. During the febrile excitement mild salines are administered. On the fourth or fifth days, when the fever abates, good beef-tea and nutrients are administered; and on the pulse becoming soft or weak, from four to eight ounces of wine daily. As the period of crisis approaches, slight diuretics are given to favour the excretory process. The results are—

Single uncomplicated cases . .	58	Average duration	$13\frac{1}{2}$ days.
Double " " . .	19	" "	20 "
Complicated cases	17	" "	$15\frac{1}{3}$ "
Unsatisfactory cases (as to duration)	8		
Deaths	3		
	105		

Ratio of deaths, 1 in 35 cases.

Average residence in the hospital of 77 uncomplicated cases of pneumonia (single and double), $22\frac{1}{8}$ days.

It has been supposed that in consequence of this comparatively small number of cases occurring in so long a period as fourteen years the disease is rare in Edinburgh. It should therefore be explained that the clinical professors are on duty alternately, and that he (Dr. Bennett) had never acted as physician to the Infirmary more than one-half of the year, and in most cases only one-third of the year. It has also been imagined that pneumonia in Edinburgh is unusually slight and trivial, or that the disease in these cases was not extensive. But it is not so. Many cases, and especially the double ones, were very severe, with great dyspnœa and very urgent symptoms. Dr. Bennett had frequently pointed out the existence in these cases of the hard and strong pulse in vigorous young men, in whom, however, the most rapid recoveries were invariably observed. It should also be noted that these cases were in no way selected, but included not a few which were admitted *in extremis* by the resident clerk, and never seen by the physician; nor such as were partly treated by other physicians in the hospital, and for which treatment Dr. Bennett was not responsible.

From these facts Dr. Bennett concluded:—

1. That simple pneumonia, if treated so as to support, instead of lower, the nutritive processes, so far from being a fatal disease, almost invariably recovers.

2. That the cause of mortality in these cases is exhaustion, either before they come under medical supervision, or, as formerly practised, by a lowering treatment. Bleedings or other remedies that do not exhaust must be regarded as palliative rather than curative, and their influence has yet to be determined with exactitude.

3. That the same rule applies to all inflammations, the amount of danger being in direct ratio to the weakness of the system; the existence of complications in other viscera, or blood poisoning.

Dr. Bennett was of opinion that these important results were not the effect of chance; of empirical experiment; of a change in the nature of inflammation, or of the force of the pulse in man and animals; of an alteration of diet or of drink, or of nervous susceptibility; nor of a change of type in disease: all of which have been supposed by some explanatory of facts which can no longer be denied. The more he considered this subject, the more was he convinced that it could only be justly attributed to the advance of medical science, and that it was a source of infinite satisfaction for medical men so to consider it. He thought it strange that some minds would rather ascribe so manifest an improvement in

the treatment of disease to hypothetical revolutions in nature which had no proof in their support, than to the increase of knowledge amongst the profession which was obvious to all. It seemed to him that if any one demanded in what way our advance in physiology and pathology had benefited the treatment of disease, no better proof of it could be found than in the diminished mortality that everywhere now accompanied attacks of acute inflammation.—*Lancet*, August 16, 1862.

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22. *The Therapeutics of Delirium Tremens.*—*The Madras Quarterly Journal of Med. Science* for October, 1861, contains some interesting observations on this subject by J. L. Ranking, Esq., Surgeon Major, H. M.'s 105th Regiment L. I.

"Within the last few weeks," he remarks, "the payment of the 'bounty' has afforded the men the means of indulging their propensities for drink to an extent which probably never fell to their lot before. Some thousands of rupees were put into circulation, and the consequence was that 81 cases of ebriositas (drunkenness in its most profound form), and 14 cases of delirium tremens passed through the hospital.

"The experience thus afforded us has led to our forming an opinion as to the therapeutics of delirium tremens which we may express in the following propositions:—

"1st. That in *the very large majority of cases alcohol* may not only be *safely* but *advantageously dispensed with.*

"2d. That *it, or other accustomed stimulus, cannot be entirely laid aside in old soldiers;* men who have drank hard all their lives, and who have experienced prior attacks of the disease.

"3d. That *opium* is *unnecessary* in *all cases, and positively injurious in many.*

"Or to express the propositions differently:—

"1st. The *young* soldier, *whose eliminative powers are unimpaired*, can be treated with safety and advantage without a drop of alcohol or a grain of opium.

"2d. The *old* soldier *with organic visceral disease*, requires no opium; but *does require some of his 'accustomed stimulus,'* combined with eliminants and nutrients.

"3d. That *opium is unnecessary in all cases;* that it often fails to induce sleep, which succeeds to its withdrawal.

"4th. That if pushed to its full extent, it may and sometimes does induce a sleep passing into coma and death."

The result of the treatment of 14 cases upon the plan indicated by Mr. R. are very encouraging:—

"Of these 14 cases, three presented all the symptoms characteristic of the fully developed disease, or of the third stage. In two there were unquestionable evidences of organic disease of the kidneys; a complication of a most formidable nature, and one materially influencing the result. One, treated *entirely without opium* and *alcohol, died;* the other, *who had a moderate allowance of alcohol, recovered.* The third, a young soldier but with a very severe attack of the disease, recovered without, as before said, a grain of opium or a drop of spirit.

"The mortality in relation to these 14 cases, then, stands as follows: One in 14 as relates to the whole group without reference to the *stages* of the disease.

"Or, all in the first and second stages of the disease recovered, while of those advanced to the third stage one in three died.

"Without appearing to contend too warmly for the treatment without opium and alcohol, we may advantageously inquire, would the case lost, taking into consideration the condition of the kidneys, and we may add also of the liver, which was far advanced in fatty degeneration—would that case have benefited by the exhibition of opium and alcohol, one or both? Knowing as we do, that opium is very ill borne in all cases of organic renal disease, that a dose of that drug which may safely be given to a healthy individual, may prove a poisonous dose to one whose kidneys are organically diseased, our answer must be, we think, in the negative. Alcohol, in a similar case occurring to us, we should with the experience since afforded us, certainly give in *moderate* doses, to sus-

tain the vital powers while the blood was being rid of its urea; for in the case alluded to, we have no doubt that death resulted from uræmic poisoning; the condition of the urine during life, and examination of the kidneys after death, proved that they were spoiled for all the purposes of elimination.

"We would also remark that this case is the only one which has occurred in our practice, which in the least degree favours the views of those who consider that the disease is often caused by the withdrawal of the accustomed stimulus.

"The patient was a known sot. On admission his case did not appear a very severe one, and it was not till the third day after admission that serious symptoms arose. Would a pretty liberal allowance of brandy from the commencement have saved him?

"It remains for us to give the promised instances of the injurious effects of large and repeated doses of opium.

"In two cases in which many nights had been passed without sleep, cases which we had treated on the eliminant and nutritive system entirely, it appeared desirable to force sleep. In each case ℥iss of the liq. opii sedativus was prescribed at 8 P.M., and ℥ss directed to be repeated every two hours till the patient slept. In both instances we were summoned after midnight, the patients being in a state of alarming sinking or collapse, both under the impression that they were dying. In both instances the opiate was withdrawn, and camphor and brandy given. They rallied slowly, and both slept the following night after the exhibition of a glass of hot 'brandy and water.' We could not attribute the condition of collapse in these cases to anything than the liq. opii—the patients themselves attributed their feelings to the opiate, and both rallied under stimulants after the withdrawal of the opiate. The *ill* effects of the opiate and the *beneficial* effects of the brandy were to our mind most apparent. These were the only two cases in which full doses of opium 'fearlessly repeated' were tried—no sleep followed, although in each case ℥iiss of the drug had been taken, and our firm impression and belief is, that, if we had continued it till the patients slept, they would have slept the sleep of death.

"We are aware that we have advanced nothing new in this paper—all has been said before, much better than we have written it.

"We are, however, so strongly impressed with the weight of the moral and, we may add, economic grounds upon which the system advocated is based, that we have considered it our duty to show the extent to which we have been able to apply it during a period of an almost unprecedented excess.

"The economic value of the system as applied to this regiment we will elucidate in our concluding remarks.

"Since the arrival of the regiment at this station in April, 1858, up to the date of our assuming charge, we find 171 cases of 'ebrietas' and 'delirium tremens,' with a total expenditure of brandy (*in such cases only*) of bottles 96 and measures 5, or allowing 24 ounces to each bottle of 14 imperial gallons.

"In our practice between 81 cases of ebriositas and 14 of delirium tremens—total 95—the expenditure has only been bottles 3 and measures 5½.

"On the old system it would have equalled (taking the average of 171 cases above given) some 53 bottles, represented in value, at the commissariat rates of Rs. 18-4-0 per dozen, by Rs. 84.

"We hope, or we should rather write *expect*, to have further opportunities afforded us of testing the merits of the system of treatment without alcohol and opium. We do not think, however, that further experience will materially modify the opinion we have already expressed.

"The systematic examination of the urine for evidences of organic renal disease should never be omitted. Prognosis hinges mainly upon the existence or non-existence of organic changes in the kidneys and liver, and we have a strong suspicion that the large majority of cases which terminate fatally will be found to be associated with such pathological conditions, as forbid the hope of elimination of the poison of alcohol, at the same time that they offer the further complication of uræmic poisoning."

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23. *Delirium Tremens—Large Doses of Tincture of Digitalis—Cure.*—M. F. MANIFOLD relates (*Med. Times and Gaz.*, Aug. 23, 1862) the case of a soldier,

aged 27, stout and muscular, brought to the hospital January 4, 1861, in a state of great nervous depression and mental anxiety after a series of debauches during Christmas week, ending in a convulsive fit, in which condition he was conveyed to the hospital from his barrack-room. He was immediately placed in bed, in a ward by himself, in charge of an European orderly, and directed the following draught—℞. Carb. ammoniæ gr. v, mist. camphoræ ℥j, liquor opii sed. ♏xx; fiat haustus s.s. et rep. tertiis horis. He was also ordered beef-tea, and the head to be kept cool.

January 5. Has had no sleep. Tremens well marked. Endeavours to get out of bed, and is with difficulty prevented from doing so. To have a calomel purge, followed by a cathartic draught combined with antimony, and one grain of morphia at bed-time; also, beef-tea and beer.

Third day. Very restless and delirious, talks wildly and incoherently, and has had no sleep since his admission into the hospital. Morphia combined with antimony repeated every third hour without producing the desired effect.

Fourth day. Much worse in every respect; wandering and delirious, although conscious when spoken to sharply. To have tinct. digitalis ʒiij immediately, and the following mixture—℞. Tinct. digitalis ℥j, tinct. lavand. co. ʒss, mist. camphoræ ad ℥viij; fiat haustus. Dose ℥j omni secund. horâ.

Fifth day. Much better this morning, after a refreshing sleep. To continue the mixture.

Seventh day. Convalescent. From this date he improved gradually, although weak, and was discharged to duty on January 18, 1861.

Remarks.—The beneficial effects of the digitalis were well marked in this case, the first dose acting as a powerful sedative, allaying irritation, and producing sleep. I would have no hesitation, in a similar case to the above, giving half ounce doses of the tincture, to be repeated, if requisite, every second or third hour; but this will seldom be found necessary.

In a case in which I was lately consulted by Dr. Barn, Royal Artillery, in which there was well-marked insomnolence, jactitation, and delirium, and where both morphia and hyoscyamus have been administered in vain in large doses the second dose of tincture of digitalis acted like a charm.

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24. *Action of Quinia upon Phthisis.*—With the view of testing, so far as practicable, the general therapeutical value of quinia in the treatment of consumption, Dr. Richard P. Cotton prescribed it for twenty-five patients, in various stages of that disease; avoiding, as in all his previous experiments, any selection of cases, and excluding only those unfitted by the existence either of acute symptoms or special complications. The dose consisted, according to circumstances, of one or two grains two or three times a-day; and was continued for periods varying from three to ten weeks. Notes were regularly taken by Dr. Harington, resident clinical assistant.

Ten of the patients were in the first, six in the second, and nine in the third stage of phthisis. Sixteen were males, and nine females. Their ages varied from twenty to fifty years.

During the administration of the quinia seven improved *greatly*, five improved *slightly*, and thirteen either did not improve at all or became worse. Of the twelve improved cases, seven were in the first stage, two in the second, and three in the third stage; and, of the thirteen cases in which the quinine seemed to be inoperative, three were in the first stage, and ten were the subjects of more or less advanced tubercular softening. Thus it would appear that whatever good may have resulted from the quinine, it was the most decided in the early stage of the disease.

In fourteen of the cases cod-liver oil was taken during at least a portion of the time. There was an increase of weight in ten out of the twenty-five patients; such increase occurring in five who had taken the oil, and in five who had not taken it, but being most marked in the former.

In four cases the quinia appeared to disagree, producing dyspepsia and loss of appetite. In six instances patients who had made little, if any, progress under the quinia by itself, were more or less benefited when steel was added to it. Two of these cases were remarkably good illustrations of the combined

influence of quinia and iron; one was in an early and the other in an advanced condition of disease, but both left the hospital with every local and general symptom in abeyance, and their health fairly good, after taking for several weeks two grains of quinia twice a-day, and a tablespoonful of steel wine immediately after dinner.

From these facts, compared with previous observations on other remedies, the following are the conclusions at which I have arrived:—

1. That although quinia may be well adapted to certain cases in which there is an evident cachexia, it is greatly inferior, as a general remedy in phthisis, to some other tonics, whilst in a few instances it is unsuited to the disease.

2. That the combination of quinia and iron is sometimes very beneficial.—*Med. Times and Gaz.*, Aug. 30, 1862.

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25. *Treatment of Acute Dysentery by the Nitrate of Silver.*—Dr. DUCLOS considers that dysentery always commences at the lowest part of the large intestine, and if such be the case, then he argues that the local medication of this part must arrest the disease and prevent its extension, or at least must modify its virulence even in the worst cases. Local treatment being, therefore, admissible in this disease, the beneficial effects will be in proportion to its employment at the earliest period. Dr. Duclos was induced to employ nitrate of silver as the remedial agent, from observing its well-known efficacy in purulent ophthalmia, aphthous eruptions in the mouth, and other such affections, and also from witnessing the practice of M. Trousseau, who employs this salt with great success, both by the mouth and in injections, in cases of simple enteritis in very young children. M. Duclos treats dysentery in the following manner: a slight laxative is first administered, such as a small dose of calomel or seidlitz powder, in order to unload the intestine of fecal matter, and then a simple mucilaginous enema is thrown into the rectum. When the laxative and the injection are both evacuated, an enema is administered, consisting of twenty-five centigrammes of nitrate of silver (a centigramme is .1543 of a Troy grain) in one hundred and fifty grammes of water (a gramme is about fifteen grains), together with some laudanum if necessary, but the latter is only added if it is quite impossible to retain the enema for a few seconds. The enema is kept in the rectum for from four to ten minutes and then allowed to return, and as it has been administered immediately after an evacuation, it is certain that the silver salt has been in direct contact all the time with the diseased surface. An enema is thus given night and morning, and M. Duclos has even given three in twenty-four hours; and this treatment is continued for several days, with the double view of avoiding constipation, which is the habitual attendant of true dysentery, and of giving the enema immediately after a dysenteric evacuation has cleansed the last portion of the intestine. The results of this treatment are, that in general the stools are rapidly modified both in frequency and composition. Most frequently, from the period of the fourth or fifth enema, they become less frequent, and also less bloody and slimy; the tenesmus also diminishes with great rapidity, and the pain produced on pressure of the left side is less acute. No bad results were observed to follow this treatment, but sometimes an excessive irritability of the anus or the rectum rendered it necessary to change the form of administering the injection. The dose of the nitrate of silver was then reduced, or a greater or less quantity of laudanum was added to secure its tolerance by the intestine. Dr. Duclos has employed the nitrate of silver in the manner described in a great number of cases of dysentery, and often with great success, and he records five cases at length. His views have been confirmed by the observations of other practitioners, and they may be summed up as follows: 1. The nitrate of silver, administered at the commencement of acute dysentery, in appropriate doses, constitutes a remedial agent which has produced very excellent results in Dr. Duclos's hands; 2. Its action has been equally efficacious, whatever may have been the age of the patient, and in all the forms of dysentery; and 3. In certain cases, when administered quite at the beginning and always in injection, it has seemed to exert, at the end of a few days, an almost abortive action upon the disease.—*B. and F. Med.-Chir. Rev.*, July, 1862, from *Bull. Gén. de Thérap.*, August 15, 1861.

26. *Treatment of Acute Rheumatism, considered with regard to the liability to Affections of the Heart under different Remedies.*—Dr. Dickson read before the Royal Medical and Chirurgical Society (June 10) a paper on this subject, based upon a tabular condensation of the cases of acute rheumatism which were admitted into St. George's Hospital during the five years ending on December 31, 1861, and in whom the heart was, on admission, unaffected by the disease. The method of treatment adopted in any particular case depended very much upon the chance of the patient coming under one physician rather than another; and a comparison of the results would, to a certain extent, be a guide to the value of the means used. The cases, therefore, were classified according to the treatment made use of. As the main object of the investigation was to ascertain the effect of remedies in preventing cardiac mischief, the arrangement was not altered by measures adopted in consequence of its occurrence. The tables were fourteen in number. The first gave the results of eight cases in which venesection was early resorted to, other medicines being at the same time used. In three of the cases endocarditis or pericarditis was clearly recognized. In one there was incomplete evidence of cardiac derangement. The heart, therefore, was absolutely uninjured in only half the number. The patients remained in the Hospital for an average period of forty-one days. Bouillaud, who is the great advocate of bleeding in this disorder, and trusted to it almost exclusively, expresses his opinion that such complications are the rule, and not the exception. The second table gives the result of six cases treated solely with repeated doses of calomel and opium. In two subsequent classes were seen the effects of the same medicines aided by saline draughts, with and without nitre. The progress of the disease under each plan appeared to be much the same. The total of twenty-four cases presented six of inflammation of the heart or its membranes, of which two proved speedily fatal. The average number of days in Hospital under mercurial treatment was thirty-seven. The action of some reputed specific remedies was then considered. With regard to opium, reference was made to some tables published by Dr. Sibson in the *Association Medical Journal.* Twenty-one cases are here recorded, in which, when the treatment was commenced, the sounds of the heart were natural. Opium was given in frequent doses, sometimes as much as a grain an hour, besides other remedies supposed to have an effect in rheumatism. No less than fourteen of these cases, or exactly two-thirds, manifested while under treatment symptoms of valvular or pericardial inflammation. The cases, seven in number, treated with nitre alone, gave only one of cardiac complication. The average duration of the treatment was reduced to twenty-seven days. Further evidence in favour of nitre was deduced by comparing the result of cases treated with saline remedies alone, and those which had salines with nitre in addition. A table contributed by Dr. Basham to the *Transactions* of the Society was quoted. Of sixty-seven cases of acute rheumatism treated with large doses of nitre, the heart being in each case unaffected at the commencement of the plan, six only had symptoms of inflammation of that organ. In considering the treatment of saline remedies, the use of the term was limited in an arbitrary manner. It was assumed that the salts which potass and soda form with the vegetable acids undergo such changes in the system as to become equivalent, or nearly so, to the same quantity of alkali in combination with carbonic acid. Whether a certain quantity of potass is given as citrate, tartrate, acetate, or carbonate, the effect upon the urine and upon the system generally was held to be much the same. The arrangement was made accordingly. Those patients treated with an aggregate of such salts not reaching three drachms a day were considered as under saline treatment; those taking as much as three but less than four drachms, as under partial alkaline treatment; those taking from half an ounce to an ounce and a half, as under full alkaline treatment. Sixty-two cases appear to have been subjected to saline treatment, alone or with other remedies. These afforded a proportion of heart affection of 1 in 3.6. The conclusion was that salines in such quantities had but little influence upon the course of the disorder; when used in conjunction with more potent remedies, the result always corresponded with the observed effect of the additional medicines when used independently. With the increased doses, which the author distinguished as partial alkaline

treatment, no diminution of the heart symptoms was observed, although the disorder terminated in rather a shorter time. The full alkaline treatment was exemplified by two tables. It consisted in the administration of the salts which potass and soda form with carbonic and the vegetable acids, in quantities varying from half an ounce to an ounce and a half daily. Half a drachm of the acetate, with twice as much of the bicarbonate of potass, dissolved in the haustus ammoniæ acetatis of the Hospital Pharmacopœia, furnished an ordinary form of prescription. This was given every four or six hours, and sometimes made to effervesce by the addition of a little citric acid. Salts of soda were sometimes resorted to. The total of forty-eight patients thus treated passed through the dangers of the disease, with only a single instance of any cardiac affection. In the exceptional case the murmur came on within twenty-four hours of the commencement of the treatment, and did not prove permanent. The average number of days in hospital, when this treatment was applied simply, was twenty-five, the smallest of all; when other medicines, as colchicum, were used in addition, five days were added to the average period. Dr. Garrod's published cases, in which bicarbonate of potass was used alone, were quoted as rather less successful than those at St. George's, in which neutral salts were given in addition. Twenty-four of Dr. Garrod's cases afforded three of inflammation of the heart or its membranes. It was concluded that the carbonates of potass and soda, and those of their other salts which in the body are capable of being converted into the carbonates, exert an especial curative power in rheumatic fever, and, if given in time, will completely protect the heart from the dangers by which it is surrounded. Taking the proportion of heart affection under the alkaline system, one in forty-eight, and, with this as a standard, reviewing the other plans of treatment, the result was striking. One hundred and thirteen cases where other remedies were used gave thirty-five instances of cardiac mischief, or a proportion of 1 in 3.2. Nitre, next to the alkalies, was the most successful. The general symptoms were shortened under its use, and the frequency of cardiac inflammation was reduced to 1 in 10. Regarding the other remedies which have been credited with the cure of acute rheumatism, it simply became a question which were useless and which injurious. Mercury allowed a proportion of cardiac inflammation of 1 case in 4. Saline treatment gave a worse result. With bleeding one-half of the cases became thus complicated. Under opium the mischievous influence of the disorder attained its maximum. Two-thirds of the cases so treated had the symptoms of endocarditis or pericarditis. With the exceptions stated, it was maintained that the more active the remedies the more untoward, generally speaking, is the progress of the disease. It was shown that the use of colchicum retarded the recovery of the patient. The practical deduction was, that acute rheumatism is best treated by giving at short intervals a solution of nitrate, acetate, and bicarbonate of potass in such doses that ten or twelve drachms of the two latter salts together are taken in the twenty-four hours. Half a drachm of the acetate, with a drachm or a drachm and a-half of the bicarbonate, and ten grains of nitre, would answer the purpose. A brief review of the history of the alkaline treatment of rheumatism concluded the paper.—*Med. Times and Gaz.*, June 21, 1862.

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27. *Veratria in Rheumatic Fever.*—In a clinical lecture recently delivered by M. BOUCHUT at the Hôpital Ste. Eugénie, the employment of veratria in the treatment of rheumatic fever in children is strongly advocated. M. Bouchut, whose opportunities for testing any novel method of medication are so extensive, comes forward with thirty cases of acute rheumatism, in which veratria has proved sufficient for the cure of the malady in from three to twelve days, the amelioration setting in on the second or third day of its administration. One of the most remarkable effects of the action of veratria in rheumatic fever is the rapid fall of the pulse; whatever its frequency, the diminution under the use of this drug is most marked, the pulse falling to sixty or even fifty, becoming almost thready and imperceptible, without causing to the patient any feeling of malaise. This abatement of the circulation M. Bouchut considers as the signal for the diminution of the doses. With regard to the effect of veratria on heart complications, this is probably indirect and due to the annihilation of the rheu-

matic poison. Besides its influence on the pulse, this medicine may, if given in too large quantities, irritate the mucous membranes, and produce vomiting, diarrhœa, and colic. The doses should therefore be small, and the ordinary formula recommended is, veratria and extract of opium one grain each, to be divided into ten pills, of which two pills are to be given the first day, three the second, four the third, five the fourth, and so on, increasing one pill each day until the condition of the pulse or the irritation of the mucous membrane compels a diminution. The difference of price in hospital practice between the use of veratria and that of sulphate of quinia, is of course one point of comparison in which the advantage remains very decidedly with the former; add to which, in a therapeutical aspect, veratria is perfectly innocent of those charges of exciting rheumatic determination to the membranes of the brain which in some measure appear to have been justly adduced against quinia since the employment of large doses of this drug has come into fashion.

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

28. *Iliac Aneurism remedied by opening the Sac, and tying the Common Iliac, and the Internal Iliac Arteries.*—Professor JAMES SYME, of Edinburgh, communicated a case of this to the Royal Medical and Chirurgical Society (May 27, 1862). He reminded the society that ten years ago he had endeavoured to show reason for regarding the preference which had been given to the Hunterian operation for aneurism as too exclusive, since the circumstances which rendered it so advantageous in cases where the popliteal artery was affected might be so different in other situations as to reverse the grounds of choice—as in axillary aneurism, where the vessel is easily reached at the seat of rupture, and with great difficulty, as well as danger, tied above the clavicle. In reply to the doctrine usually taught, that the artery is not in a condition suitable for the ligature so far as the aneurismal sac extends, it was remarked that the size of the tumour does not depend upon the state of the vessel, and therefore cannot be taken as any measure of the extent to which its coats are impaired; while the formation of a sac, so far from proving injurious to the artery, must rather tend to strengthen and support it by consolidating the textures in its neighbourhood. Trusting to this view of the matter, the author had operated with success in various cases, and now desired to relate one of recent occurrence, which seemed strongly corroborative of the opinion he had expressed. R. L., a seaman, aged 31, towards the end of November last received a blow on his left groin, which caused a painful swelling that was treated as glandular; and about a month afterwards strained himself on the same side in leaping from a ship that was about to sink, with the effect of causing the formation of another tumour some inches higher up than the former one. On this account he repaired to the Cumberland Infirmary, at Carlisle, and was then found to suffer from an iliac aneurism. After remaining a week in the hospital, he went home until the end of February, when he was admitted into the hospital of Dumfries. Operative interference having been there declined, the patient again went home and betook himself to intemperate habits, with the effect of injuring his health and greatly increasing the tumour. On April 18 he was admitted into the Royal Infirmary of Edinburgh, when the aneurism was found to extend from below Poupart's ligament considerably higher up than the umbilicus, and from two inches beyond the middle line of the abdomen towards the right side, completely across the left iliac region, so as to overlap the crest of the ilium. There was a strong pulsation throughout the whole extent of the tumour, great pain in the course of the crural nerve, and considerable œdema of the thigh. On the 20th, chloroform having been administered, the cavity was examined by introducing first one finger, then another, and finally the whole hand, without any trace of the artery being detected, whence it was concluded to be out of its usual situation. A screw clamp

provided by Professor Lister, of Glasgow, was then employed to effect compression of the aorta; and this having been ascertained to be complete, a free incision was made through all the textures concerned, so as to lay the sac fully open, and allow six pounds of blood and clots to be scooped out. It then appeared that the arterial orifice was in the roof of the aneurism, from the vessel having been raised in this direction by the blood effused under it; and this orifice being brought distinctly into view by dissection of the sac, was tied on both sides of the vessel. But as blood still issued, though not with the same force as before the ligatures were applied, it was concluded that the internal iliac originated from the portion of artery comprehended between them; and this vessel also having been exposed, was tied by a thread passed round it. The wound was then dressed superficially, and everything went on favourably. On the nineteenth day the ligature separated, and the cavity gradually contracted. Some observations were then made—1. On the importance of ascertaining that the aorta could be effectually compressed so as to prevent hemorrhage from its primary branches. 2. On the sac not maintaining a profuse and protracted suppuration like the investment of a chronic abscess, but readily contracting so soon as the distending force ceased to act. 3. On the impossibility of affording relief in the case related by any other means than the one employed, and the danger which would have attended ligature of the common iliac at an earlier period from the aperture being so near the bifurcation. In conclusion, the author expressed his hope that the cases of carotid, axillary, gluteal, and iliac aneurisms which had come under his observation would induce teachers of surgery to reconsider the propriety of representing the Hunterian operation so exclusively the rule of practice as it had hitherto been regarded.

Mr. S. said there were three points to which he wished especially to direct attention: First. That there was no reason to conclude that the artery in the sac of an aneurism was unsound beyond the point of rupture, and, if sound, it was better to tie near that point. Secondly. That the artery, if unsound at the seat of the aneurism, is just as likely to be unsound at parts at a distance, where, according to the Hunterian method, it is usual to tie it. In the case of axillary aneurism which he had previously brought before the society, the patient got quite well and to his work, but afterwards died of aneurism of the aorta. In this case the whole arterial system was diseased. Thirdly. If the arteries are unsound, it is better to tie near the ruptured part. In ligaturing arteries in stumps after amputation, he had found the arteries so diseased that they grated under the ligature, and yet the case did well. In some cases, as in popliteal aneurism, it was impossible to tie the artery at the ruptured part. He felt confident that these principles were correct; but one case, under Sir Astley Cooper's care, of ligature of the abdominal aorta, made him feel anxious. The patient was a man, aged 38. The aneurism followed a blow. It gradually increased in size, and pressure applied to it caused sloughing, followed by hemorrhage. Sir Astley Cooper endeavoured, by making an opening, to compress the artery, but on introducing his hand felt nothing but a confused mass of clots. He therefore enlarged the wound, and ligatured the aorta above the bifurcation. In the dissection of this case it was stated that the track of the artery was not in the aneurism. He (Mr. Syme), with the greatest respect for the opinion of Sir Astley Cooper, felt inclined to believe that he had been mistaken, rather than that there was an exception to the universal rule.—*Med. Times and Gaz.*, June 14, 1862.

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29. *Ligature of the Common Iliac Artery.*—Mr. E. R. BICKERSTETH relates (*Edinburgh Medical Journal*, July, 1862) the following interesting case of this:—

"T. A., æt. 39, a strong, muscular man, by trade a boiler-maker, was admitted into the Royal Infirmary under my care on the 24th of February last. He is of sanguine temperament, of steady habits, but deaf, as nearly all boiler-makers are. Till within a few days of his admission he had worked at his trade without much inconvenience. He stated that three or four months before he had felt some uneasiness in the right side of the abdomen and in the front of the right thigh, but that until about six weeks ago there was no perceptible enlargement to be

discovered. He then found a tumour a little above the right groin, which continued to increase up to the time of his admission. He could not recall any accident or other cause for its formation.

"On admission, a pulsating tumour was felt occupying the entire iliac fossa, and extending in the direction of the artery from an inch and a half below Poupart's ligament to within two inches of the umbilicus. When the patient was recumbent the tumour did not cause any perceptible fulness, except in the groin, where it was raised about an inch above the natural contour; but, on feeling through the abdominal parietes, which were very strong and muscular, the tumour was distinctly felt occupying the whole of the iliac fossa, extending laterally from the ilium to beyond the linea alba. Superiorly, owing to the thickness of the parietes, it was impossible to define its exact limits; but when the fingers were pressed deeply into the abdomen, two inches below and to the outer side of the umbilicus, the rounded upper end of the tumour was felt expanding with each pulsation, and gave the impression that the aneurismal sac extended even higher than could be felt. Pressure upon the tumour caused considerable uneasiness, without perceptibly decreasing its volume; but, from its position and shape, and from the very distinct pulsation, there could be no doubt of its being an aneurism of the external iliac artery.

"For a few days the man was kept quiet in bed, directions being given that no one should examine or handle the tumour. It appeared, however, that the examination on admission had disturbed the parts; for he soon began to suffer acutely from pain down the thigh and leg, and also from pain in the tumour itself, with griping and flatulence over the abdomen generally. Opium and emollient applications afforded partial or temporary relief; but the tumour enlarged rapidly, and the abdominal pain became so severe that the patient complained greatly, and got into a restless and feverish condition. It was evident that if any operation was to be undertaken, it must not be longer delayed. From the high position of the tumour, I was convinced ligature of the external iliac would be impracticable, and that the common iliac must be tied, if, indeed, it even could be reached: for I was not without grave suspicion lest, after dividing the muscular parietes of the abdomen, I might find the sac of the aneurism extending upwards so as to involve this artery also.

"The abdomen was much distended and hard from muscular contraction, depending apparently on colicky pain, from which the man now almost constantly suffered. A dose of castor oil with laudanum was ordered, to be followed the next morning by a turpentine enema should the belly continue tense.

"*March* 4. The bowels having acted freely with the enema, the abdomen was fortunately much softer and less swelled. Chloroform was administered. I made a nearly vertical incision, five inches in length, midway between the anterior spine of the ilium and the umbilicus. One inch of the incision was above the level of the umbilicus, and the lower four inches passed in a slightly curved direction (the concavity being inwards) over the surface of the tumour. Having divided the skin and fascia to this extent, I dissected through the muscles and fascia transversalis at the lower end of the incision, and then introducing my finger as a guide, I separated and protected the peritoneum, and with a blunt-pointed curved bistoury cut through all the textures to the full extent of the external wound. Laying aside the knife, and using only the fingers of both hands, I then carefully detached the peritoneum from the upper edge of the iliac fossa, and from the top of the aneurismal sac, which I could feel pulsating strongly in the position in which I had hoped to find the common iliac artery. Having continued the separation of the peritoneum from off the upper end of the aneurism, and rather to its inner side, the forefinger of my right hand came upon the artery, which appeared to be somewhat displaced, being pushed inwards, and rather lifted up by the tumour, upon which it rested. My colleague, Mr. Long, greatly assisted me at this part of the operation, by pressing aside the peritoneum and abdominal contents with one hand, while with the other he introduced the narrow end of a long flat copper spatula to the bottom of the wound and to the inner side of the artery, which was thus, with a little care and a good light, brought into view. I had now no difficulty in exposing it; and having opened the sheath with a narrow-bladed, sharp-pointed knife, I easily

insinuated from within outwards an aneurism needle armed with a single silk ligature round the vessel. This was tied as tightly as possible, and all pulsation in the tumour at once ceased. No bleeding occurred during the operation, and the wound, being carefully sponged, was therefore at once closed with metallic sutures. The operation from beginning to end did not occupy more than twenty minutes. I could not satisfy myself regarding the exact spot at which the artery was tied. It appeared to be immediately beneath the umbilicus; and, as I could not feel any branch given off from it within half an inch of the spot at which I passed the ligature, I suppose it must have been very near the middle of its course, or perhaps rather nearer to the aorta. The right leg and foot were surrounded with cotton wadding and a flannel bandage, and the patient removed to bed. The subsequent progress is thus reported:—

"Next day, *5th*. Has passed a more comfortable night, and has had less pain than for several weeks. The abdomen is flat and soft; the tumour smaller and harder, and free from pulsation. The epigastric artery is distinctly felt pulsating vigorously upon the surface of the tumour. The foot and leg warm, and of a healthy colour.

"*7th*. All going on favourably. On removing the dressings from the wound, a quantity of bloody fluid oozed from the incision by the side of the ligature, but at all other parts the wound has healed by the first intention.

"*8th*. The escape of bloody serum from the wound continues. There is evidently also a considerable extravasation of blood in the abdominal parietes on both sides of the incision.

"*9th*. Fluctuation and bulging of the abdominal walls over the crest of the ilium is felt, and arises from retention of fluid in the cavity of the wound. An incision through the skin in this situation gave vent to a large quantity of stinking decomposed blood.

"*10th*. Up to this date the patient has taken from one to two grains of opium night and morning, with the object of keeping the bowels quiet, and they have not acted. The man has continued quite comfortable and free from symptoms of constitutional irritation. To day the abdomen is somewhat uneasy, the pain arising from flatulence. Ordered an enema, and to omit the opium.

"*11th*. The bowels have acted freely, and the patient is more comfortable. The wound looks well; but there is still a very profuse discharge of fetid matter from both incisions. Ordered six ounces of wine daily.

"From this time all went on very satisfactorily: the discharge diminished daily. On the 6th of April, the ligature came away, and a few days afterwards the wound had entirely healed. The man was then allowed to leave his bed and walk about. As there was some tendency to hernia, evidenced by bulging of the abdominal walls at the lower end of the cicatrix, he was directed to wear a belt to support the part. He remained in the house some time longer for the treatment of a very tight and callous stricture of the urethra, anterior to the scrotum, but was at length discharged cured on the 10th May. The aneurismal tumour had then diminished to one-fourth of its original size, and still felt perfectly solid and free from fluctuation.

"The most interesting pathological feature of this important case was the peculiar position of the common iliac artery, which, instead of being covered and enveloped by the sac of the aneurism, rested upon its inner and upper surface. Had it not been for this (which analogy shows to be a most unusual disposition of parts), I believe it would have been practically impossible, owing to the high position of the aneurism, to have tied the artery without opening the tumour. The possibility of being compelled to undertake this formidable measure, or otherwise abandon the case, had occurred to me before the operation. Its feasibility and practical results in the case of subclavian and carotid aneurism, otherwise beyond the reach of surgical art, had been demonstrated in the admirable operations recorded by Professor Syme; and I was prepared to seek the artery within the tumour, if unable to reach it in the usual position. Previous experiment on the patient had proved that it was impossible to compress the aorta effectually while this was done; but still I hoped that the dissection made in a vain endeavour to find the common iliac, might at least enable an assistant to apply efficient compression on that vessel, or on the aorta, during

the brief time that would be occupied in clearing out the clots and securing the artery in the interior of the tumour."

30. *Resection of the Elbow.*—M. Bauchet exhibited to the Société de Chirurgie of Paris, a patient whose elbow he had resected in 1858. The result is as satisfactory as possible. The patient enjoys excellent health, and uses his forearm and hand as if his elbow had not been removed. All the motions of the limb are easily performed, and its sensibility is everywhere unimpaired. Flexion is very complete; and extension is made voluntarily and forcibly, as may be judged by grasping with the hand the forearm, and trying to resist the motion. —*Gazette Hebdomadaire*, 4 July, 1862.

31. *Complete Resection or Extirpation of the Astragalus.*—Dr. Oscar Heyfelder, of St. Petersburg, relates (*Dublin Quarterly Journal of Medical Science*, Feb. 1862) two cases of extirpation of astragalus, which have occurred to him since he published his book on resections of bones and articulations.

Case 1. Ivan Terasimof, 30 years old, coachman, received a semi-luxation of the astragalus by a heavy butt falling upon the back of the extended and fixed right foot. No wound of the skin, but a very considerable swelling of the ankle. Received into the hospital for workmen: the inflammation and swelling yielded to an antiphlogistic treatment; but the skin of the back of the foot where it was over-extended by the luxated astragalus, became gangrenous, and the foot remained in the position of extension, the ankle-joint being incapable of any movement. After some weeks, not only this state remained, but a fistula had formed itself on the inside of the foot, corresponding to the anterior and exterior parts of the astragalus, where a probe might be introduced into the softened osseous tissue, and easily made to penetrate even to the skin at the exterior side of the foot. The dislocation of the astragalus being an irreducible one, and the osseous tissue being even carious, I proposed the extirpation of the dislocated bone; the more so as this operation, in sixty-three previously recorded cases, had given very good success.

The 28th of September, 1860, I proceeded to the operation. A curved incision, the convexity towards the toes, divided only the skin, and permitted me to separate the skin from the subjacent tissue, to separate the well conserved extensor tendons, and put them aside. The dislocated astragalus being pressed into the tissue of the cuboid bone, and firmly retained by the posterior and inferior ligaments, it could not be removed but with much difficulty, and by dividing the tendons of the extensor digitorum longus. The astragalus being extirpated, and the morbid parts of the cuboid being removed by help of a gouge, I joined the wound with silver sutures, fixed the foot upon a splint, and laid it in a warm water bath.

30th September.—The pains of the wound very tolerable in comparison with what he had suffered before. Suppuration good; the whole state very satisfactory. On the 8th October the sutures were removed, and almost the whole incision found closed by the first intention. The movement of the toes very easy, and not at all painful. In this, as in other cases, the *secondary operation*, in comparison with primary ones, has proved preferable, by the slight degree of reaction, and, in general, by the easiness with which this was supported.

When the permanent bath ceased to be agreeable to the patient (about the 14th day), the limb was put in a dry bandage, and, from time to time, movements were undertaken. He received a corroborating diet, and went on pretty well; when, three weeks after the operation, the foot was taken with erysipelas, which is almost endemic in that hospital.

A fortnight after his restitution, when the movement of the toes, and even of the ankle joint, had been established, hospital gangrene broke out in the wards, with which he was very dangerously affected. Our usual remedy, cataplasms of grated carrots, and the internal use of decoction of cinchona with aromatic tincture and acids, restored the man, after that even amputation had been taken into consideration. From the seventh week the convalescence went on without further interruption. Active and passive movements took place every day; and with the beginning of December the first essays of walking could be made with-

out much pain or difficulty. The 26th December the man left the hospital, quite restored to health, his foot being cured. The wounds closed; position and movement normal; no deformity; the shortening of the limb 1½cm. (six-tenths of an English inch); the sole something flat; the back of the foot of a quite normal form; sensibility, temperature, and the colour of the skin like that of the other foot.

CASE 2. Ludwig Susemuhl, 14 years old, baker, of a delicate complexion, fell in the beginning of the month of October, 1860, and got a distortio in articulo pedis, whose consequences had not yet quite disappeared, when he fell a second time, and hurt the same ankle-joint in a very painful way. When he entered the hospital for workmen, on the 10th November, we found an irreducible dislocation, a considerable swelling of the foot, great painfulness, which increased by touching or movement; inability to walk. Twenty leeches, and fomentations with aqua saturnina could only allay the pains and inflammation, but not change the general state of the foot; nor could the local application of unguents, and the internal employment of nitrate of soda cure the symptoms of a local chronic inflammation and a general state of fever. Abscesses, which formed on the inner side of the ankle-joint during the month of December, were opened, and gave issue to a laudable pus. They corresponded to a rough, carious, and softened part of the astragalus. The whole bone proving carious, and the neighbouring bones being intact, I proceeded, on the 28th of December, to the removal of the diseased astragalus. As I believe it of great importance in all resections that the wound of the skin should coincide as little as possible with the defect in the bones (the former should be as far as possible from the latter), I made a real gaiter-like incision (like that of Baudens for the ex-articulation of the ankle-joint). Continuing, as in the former case, and finding the bone not as firmly attached, I succeeded in keeping sound all the extensor tendons, and in removing the bone in two halves. The tendons being isolated, and kept aside, I introduced the chain-saw, and divided the astragalus in an oblique line. No bloodvessel being to tie, I adopted the same bandage and treatment as in the former case. The local success being almost as good as after the first operation, the symptoms of tuberculosis pulmonum et intestinorum showed themselves more and more; the wound got gangrenous; and in the end of January he died with phthisis generalis. The *post-mortem* examination proved lungs and bowels covered with tuberculous deposits, and the wound of the foot filled with unhealthy pus, notwithstanding its partial reunion.

If we add these two cases to the rest, the operation has been done in seventy-eight cases since the year 1670, when Fabricius Hildanus performed it for the first time. After him it has been executed by Broglie, Aubray, Ferrand, Desault (five times), Manduyt, Laumonier, Rumsey, Trye, Hey, Charley, Daniel, Percy, Roux, Dupuytren (four times), Evans, Green, Lynn, A. Cooper (twice), West, Stevens, Follot, Nowood, Cloquet, Arnott, Thierry, Norris, Heidenreich, Hinterberger, Rognetta, Dietz, Quetalet, Velpeau (twice), Robert, Wackley, Chabanon, Thore, Letenneur (twice), Statham, Estevenet, Hancock, Addenbrock, Smith (eight times), T. F. Heyfelder (twice), Chassaignac (twice), Gisborne, Husband, and the Author (twice). Partial resections have been made by Moreau (the father), Duverney, Rattley, Champion, and another English surgeon whose name I do not know. So that five out of 78 were partial—73 total; 11 of the 78 operated on died, 67 lived. Of this 67 operated on, whose lives were preserved, two were afterwards subjected to amputation—one for deformity and uselessness of the member; 65 were fully restored. The fatal cases form, consequently, one-seventh; the unsuccessful ones, one-sixth of the total number.

Ankylosis of the ankle-joint is not at all, as Boyer pretends, the necessary consequence of the operation; as, out of the 67 successful cases (which generally are not even extensively enough communicated) I found 10 in which the movableness of the foot, or even the formation of a new articulation was established and expressly named. Ankylosis may, of course, take place by very acute inflammation, by want of passive and active movements, or by retraction of extensive cicatrization, as it happened in one of Chassaignac's cases.

The indications for this operation are exceptionally caries or necrosis; usually

traumatic injuries (69 times out of 78), these may be gunshot wounds, or fractures, or complicated luxations; the latter are the most frequent cause for the extirpation or resection of the astragalus; 68 out of 78 cases were operated on for this reason. Not only luxations complicated with fracture (twice out of 68 times), with wounds, with secondary disease of the bone, but even fresh and simple luxations, which cannot at all, or not without much difficulty and power be reduced, should rather indicate the partial or total resection, as Dupuytren (*Annuaire Méd. His. des Hôp. de Paris*, 1819, p. 28) did in one case with full success. On the contrary, I believe that in my second case, and in one observed by Professor Bruns (*Deutsche Klinik*, 1857, pp. 479, 480), where the man died without having been operated on, an early resection of the astragalus might have saved the life.

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32. *Compound Comminuted Fractures of the Skull.*—Dr. A. Wynn Williams read a paper on this subject before the British Medical Association at its late meeting. The author, after some general remarks on injuries of the head, related briefly a few cases which had come under his care.

The first case is that of R. E—, aged twenty-eight, who consulted me in May, 1851. He was a fine, powerful man, but of exsanguined appearance. He informed me that two years and a half previous to his consulting me, whilst working in Mr. Assheton Smith's slate quarry, he was struck on the head by a small piece of slate rock, which had been thrown by the force of a blast of gunpowder a considerable height into the air, and afterwards fell perpendicularly on his head; he was knocked down and rendered senseless by the force of the blow, and remained considerably confused for some days. He so far recovered as to be able to walk about; but from debility had been unable to do any work from the date of the accident. The patient was attended at the time by the "bone-setter," who, as the man stated, did nothing but put a bit of plaster on his head; he had also been seen at different times by several surgeons, who had not thought it advisable to interfere in the case. The man had had a wound in his head since the occurrence of the accident, through which three or four small spiculæ of bone had on various occasions worked out. On examining his head, I found a depression over the upper and frontal end of the right parietal bone, in the centre of which was a fistulous opening discharging offensive pus. Introducing the probe, I detected several pieces of loose bone. I made a crucial incision through the integuments, and, after dissecting back the flaps, perceived a fissure in the skull, of about half an inch from before backwards, and somewhat less from side to side. After cutting away the callus that partially filled it up, I succeeded in picking out eighteen small roughened spiculæ of bone. I could then distinctly see the pulsations of the somewhat roughened dura mater. Considering it possible that there might be still some spiculæ remaining, I filled up the wound with lint to prevent its healing. At the expiration of a week, finding that the wound continued to discharge offensive pus, I made another examination with the probe, and discovered a piece of bone lying under what appeared to be healthy bone, but which I was unable to draw out with the forceps. Not liking to remove a piece of sound bone out of my patient's skull, either by the trephine or the saw, I notched the bone on either side of the opening with a pair of strong bone nippers, and through the opening thus made succeeded in abstracting a piece of the inner table, quite smooth on its under surface, of the shape and size of the half of a half-crown piece, together with several smaller ones. The whole number on this and the previous occasion amounted to twenty-four. I kept them by me for several years; but on my removal from Carnarvon to London they were unfortunately lost. After this the wound closed, and the man shortly returned to his work.

The second case is that of E. W—, aged thirty-five. He consulted me in December, 1853. This man received the injury from which he was suffering about a year and a half previous to my seeing him, in a manner precisely similar to the man whose case I have just related. The fracture was situated on the upper and back part of the left parietal bone. I operated in the same way as in the preceding case, and succeeded in removing all the pieces of loose bone—three in number—at the first attempt. They were not roughened as in the first

case, and, with the exception of one piece removed from my first patient on the last occasion, were of larger size. This man, after the removal of the loose pieces of bone, made a rapid recovery.

The third and last case which I shall relate, O. R—, aged fifty-six, I was requested to see on July 12, 1858. He had met with an accident similar to the two others three days previous to my seeing him. He had suffered on more than one occasion, anterior to the accident, from phrenitis. I found him lying in a state of semi-stupor; occasionally, however, he would become excited and even violent. On examining his head, I found a starred wound in the scalp, situated on the right side of the upper and back part of the frontal bone, extending through both tables. Feeling with my finger some detached pieces of bone, I at once enlarged the wound in the scalp, and removed five fragments of bone. I filled the hole with lint, and placed a piece wrung out of cold water over all, giving orders to have it renewed when necessary; prescribed a pill containing two grains of soap-and-opium pill and extract of henbane, and one grain of calomel, to be taken every four hours, with a saline mixture. To have milk diet. I did not see him again until the 14th, when I found him quieter and more rational, and he had had several hours' sleep. Ordered to take the pills and mixture three times a day. On the 17th, finding that his bowels were acting too freely, a chalk mixture with aromatic confection was substituted for the saline. His gums became slightly affected on the 22d. The pills were then discontinued; but as there was still more or less restlessness and irritability of the system, a saline draught with four drops of Battley's solution of opium was given three times a day. From this date he progressed steadily, requiring no medicine except an occasional aperient. The wound was, however, kept open by means of tents; and on the 18th of August I succeeded in removing with the forceps three more fragments of bone, after which the wound healed up; and my patient returned to his work six weeks after the date of the accident. I may here mention that the medicines, more particularly the calomel, were prescribed more on account of his antecedents than because of the accident. In the February following, whilst at work in the quarry, he was again attacked with phrenitis, and died. I did not see him at the commencement of the illness, but was informed that he had been drinking hard several days previous to the attack. From the appearance of the cicatrix over the seat of the injury, and taking into consideration the fact that prior to the accident in July he had suffered from similar attacks, I think that the injury to the head seven months previously had little or nothing to do with his death.

It may be considered remarkable that such serious injuries could have been inflicted on the skull without injuring at the same time the brain or its membranes beyond the mere concussion; but when it is remembered how readily the shell of an egg may be broken without injury to the membrane by which it is lined, when struck by a peculiar, sharp, and at the same time light blow, the fracture of the skull without injury to the dura mater need no longer be a cause of surprise.

The splintering of the inner lamina of the skull to a greater extent than the outer has until very lately been attributed to its greater brittleness. Mr. Erichsen, however, does not consider this to be the only cause. He remarks: "I should rather attribute it to the direction of the fracturing force from without inwards, causing a certain loss of momentum in passing through the outer table;" and instances the case of a man who discharged a pistol into his mouth, the bullet passing out through the vault of the head, the larger fracture being in the outer lamina. For my part, I think there is another cause besides brittleness of the inner table, or the loss of momentum in the fracturing force, and I hope to demonstrate to you, and this meeting, that this third cause is the main one. The support given to the layer first struck by the layer last struck prevents the former from being fractured to the same extent as the latter, which has no such support. For instance, take a piece of slate and knock a hole through it with a sharp-pointed hammer, and the place of exit will be considerably larger than the place of entrance. Now, as either side of the slate is equally brittle, we may, I think, dismiss the different degrees of brittleness without further com-

ment. As regards the loss of momentum, suppose we take a piece of slate rock, of somewhat less than a quarter of an inch in thickness, and split it into three thin slates; take two of these slates and place them in exact apposition; strike them with the pointed hammer with sufficient force to drive it through both, and of course the slate last struck will have a larger hole in it than the one first struck; but if you now place the three slates in exact apposition and strike them with the hammer, you will find, on examining them, that there is little or no difference between the first and second struck, because the first was supported by the second, and the second by the third; whereas the hole in the third will be considerably larger than in the first or the second, because it had no support at the point of exit.

It is the opinion of all writers of the present day on injuries of the head, that when small fragments of bone are driven down upon the dura mater, inflammation is almost certain to be set up and be propagated to the brain. The late Mr. Liston writes: "The presence of numerous sharp spiculæ of the internal table for even a short period upon the surface of the dura mater (and the more so if any of them have penetrated) is almost uniformly followed by internal inflammatory action, propagated to the brain and its more immediate investments." Prescott Hewett, in Holmes's *System of Surgery*, says: "But in the punctured fracture, in which sharp splinters of the inner table are driven down upon or into the dura mater, inflammation almost invariably arises sooner or later; and of all compound fractures of the skull, the punctured fracture is on this account the most dangerous, and the one which most imperatively calls for the use of the trephine." Erichsen states: "In the punctured fracture it (the trephine) is applied, not to remove symptoms of compression, which in all probability may not exist, but with the view of preventing inflammation, which would to a certainty set up if the splinters of the inner table were allowed to continue irritating the membranes or brain. Hence it is a rule in surgery, in all cases of punctured fracture, to apply the trephine at once, so as to prevent the injurious after-consequences which must otherwise necessarily arise."

I need not detain you longer quoting opinions. Suffice it to say that all modern writers express very much the same opinion. I cannot help expressing some surprise that men of such high professional attainments, and who are engaged in propagating surgical knowledge, should all express the same opinion, and in very much the same words. I think you must agree with me, after the history of the few cases I have read to you, that no such intense inflammatory action is likely to be set up, and also that unless the brain and its membranes have themselves received injury at the time of the accident, either laceration, contusion, or compression, no brain symptoms beyond what is produced by the concussion are likely to occur. In the first case, numerous sharp spiculæ of bone—probably not so numerous as they afterwards became, owing to the natural process of removal wherever the fragments were surrounded by healthy granulations—lay in contact with the dura mater for the period of two years and a half; in the second case, a year and a half; and in the third case a portion of the fragments were allowed to remain five weeks; without in either case exciting more inflammatory action than would have been set up in a similar injury inflicted on any of the other flat bones of the body. The amount of pus secreted is not more than is required for the natural process of repair. It is only, as in other parts of the body, when matter is allowed to lodge and burrow between the membranes and the bone, that it becomes injurious. This I have seen exemplified in cases where there has been a comminuted fracture without a wound in the scalp. In such cases, when pus is formed, it has no outlet, and generally burrows between the dura mater and the bone, creating irreparable mischief, if without delay the surgeon does not turn the non-compound fracture into a compound one, by making an incision through the integuments. By thus giving exit to the pent-up matter, all symptoms of compression and injury to the brain will cease.

I have only discovered one author who has written on injuries of the head who appears to agree with me in believing that the brain and its membranes are not particularly prone to take on inflammatory action, and this is that very talented writer and accurate observer of Nature, and all her efforts at repair,

Sylvester O'Halloran,[1] of Limerick, who published a work on External Injuries of the Head in 1793 (only a few years after Percival Pott published his work), wherein O'Halloran very justly blames Pott for his rash and unjustifiable abuse of the trephine. He at the same time calls in question Mr. Pott's and other previous authors' antiphlogistic treatment of injuries of the head, on account, as they presupposed, of "a high tendency to irritability and inflammation in the cerebrum and its coverings." He goes on—"But is this supported by facts? It undoubtedly is not! Every observation proves they have very little tendency to either; at least the most violent external injuries offered to them establish the fact." Further on he writes—"To a certainty, then, neither the brain nor its envelopes are subject to inflammation or irritability, at least from external hurts."

With regard to the treatment of such cases, I have little more to relate than has been already stated in the history of the cases. Of course as there is little tendency to that bugbear inflammation, you need not bleed your patient; but after the immediate effects of the concussion are gone, an opiate will often give great relief to the peculiar restlessness of the patient. As regards other remedies, your patients will, as a rule, do as well without them as with them. Surgically, they should be treated on the same principles as would guide you in treating comminuted fracture in other parts of the body. There is, however, one surgical point which I most particularly wish to impress on the members of this Association and others: it is the advisability of substituting, when compelled to operate in a case of fracture of the skull, the bone-nippers (wrongly called bone-forceps) for the trephine and saw. If the operator can only introduce the point of one of the blades through the fractured bone, he will be surprised to find how readily he can enlarge the opening in this or that direction as might be deemed necessary, without removing more of the skull than is absolutely required for the extraction of the loose pieces or the liberation of those depressed.—*Lancet*, Aug. 23, 1862.

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33. *Old Dislocations and their Treatment.*—Mr. B. E. BRODHURST communicated to the Royal Medical and Chirurgical Society (June 10, 1862) some observations on this subject. The object of his communication was to show that dislocations might with great advantage be reduced at a much later period, now that chloroform is in use, than formerly; yet the author contended that this fact has in great measure been overlooked, and that the teaching of Sir Astley Cooper—namely, eight weeks for dislocations of the hip, and three months for those of the shoulder, was still all but universally observed. He referred to the obstacles to the reduction of old dislocations, and he then considered the means of overcoming them. He pointed out two great distinguishing features of old dislocations—namely, on the one hand, the recovery of motion and the formation of a new joint; and, on the other, a painful position of the head of the bone, together with a motionless condition of the limb; and he suggested that interference was to be deprecated when motion was being restored and the new joint was becoming perfect, but that reduction might at any time be attempted whilst the limb remained motionless and painful. A case was related of a muscular man, fifty-three years of age, who, having dislocated the humerus beneath the pectoral muscle, came under the author's notice when the dislocation had existed nearly six months. The author reduced it on the 175th day. The reduction was most easy and immediate; there was no disposition for the bone again to become displaced, and the patient recovered almost the entire use of the limb. In conclusion, it was observed that extension ought not to be employed primarily in the reduction of old dislocations, and the argument adduced was as follows: The adhesions round the head of the bone must always be ruptured prior to reduction. If they are ruptured by the use of the pulleys, so much force is required in extension, when the dislocation is old and the adhesions are tough, that there is danger of rupturing the muscles and breaking the neck of the bone; but if they are ruptured by to and fro movements the pulleys are unnecessary to replace the limb, traction and manipulation being sufficient for this purpose.

[1] I have to thank Dr. O'Connor for the knowledge of this work.

The author summed up thus: "With chloroform, no precise time can be set as a limit to the reduction of an old dislocation. When useful motion is being regained—when the new joint is being formed, and pain has subsided, attempts at reduction may be deemed unjustifiable; but while the limb remains painful and motionless, the dislocation is reducible, and it ought to be reduced."

Mr. POLLOCK said that Mr. Brodhurst had only adduced one case in support of his plan of treatment. It was not uncommon for dislocation of the shoulder-joint to be reduced under chloroform after an interval of five or six months. He (Mr. Pollock) related some cases in point. He thought that Mr. Brodhurst would modify his opinions with respect to the use of the pulleys in cases of old dislocation of the hip-joint. When extension was made in the right direction, under chloroform, these dislocations were to be reduced with more facility by the pulleys than by any other means. He alluded to those cases in which the head of the thigh-bone was dislocated into the ischiatic notch. It was not necessary that pulleys should be used in cases of dislocation of the shoulder-joint. He inquired if Mr. Brodhurst had had any experience in the reduction without pulleys of long-standing cases of hip-joint dislocation.

Dr. WYNN WILLIAMS said it was his lot to practise for a good number of years in a neighbourhood where nearly all fractures and dislocations were treated by what were termed "bone-setters;" consequently he had had under his care numerous cases of unreduced dislocation. Now, if the teaching of the London Schools was still such as stated by the author of the paper, he (Dr. Williams) could only say that practice had shot far ahead of teaching. He could answer for himself as well as for his brother practitioners practising in the vicinity of the Carnarvonshire and Merionethshire slate quarries, that since the introduction of chloroform they had followed no general law, but had attempted the reduction of old dislocations whenever there appeared to be any chance of success. He could call to mind two cases in his own practice which would fully bear out what he had stated. The first was that of a man who consulted him as to the possibility of reducing a dislocation of the elbow-joint of four months' standing. It had been caused by the man having fallen from a load of hay, his right forearm passing through the riples of the cart and arresting his further descent. The bones of the forearm were driven backwards on to the humerus. He had been under the care of a bone-setter, who, instead of reducing the dislocation, placed and kept the arm in a perfectly straight position, so that it hung useless by the man's side. Dr. Williams found the joint immovable; indeed, it appeared as if union had taken place between the bones of the upper and forearm. He placed the man fully under the influence of chloroform, and applied extension by pulleys for some time, using considerable force, but without any effect. He then placed his knee in the elbow, and suddenly bent the forearm on the arm, and felt a distinct crack, as if a bone had broken. It was caused by the separation of the ulna from the humerus, a small portion of the former (a fragment of the olecranon) remaining attached to the humerus. After this reduction was not difficult, and the man acquired a very useful arm. The other case was that of a boy between eight and nine years of age who, having fallen from a height with his legs separated, dislocated the left hip-joint. He had been attended by a bone-setter for about five months previous to being seen by him (Dr. Williams). He determined to attempt reduction, and went with his assistant on the following day to do so. After administering chloroform, he thought he would try to reduce the dislocation in the first instance without using the pulleys. To his surprise he found no difficulty in doing so. The difficulty was to keep the bone in its place after it had got there, for the moment he ceased making extension out it went again. He, however, fixed it in position by means of a long splint and a pad. But several times in the course of treatment the little fellow would suddenly start during sleep, and out would go the head of the bone. He taught the boy's father how to reduce the dislocation and tighten the bandage, so that the bone was reduced almost immediately. After a few weeks some thick gutta percha was moulded so as to embrace completely both buttocks, the gutta percha being brought well round on either side. By this means he was enabled to keep the head of the bone firmly in position, and the

last time he saw his patient he was gathering water lilies out of one of the lakes. —*Med. Times and Gaz.*, June 21, 1862.

34. *Inversion in Strangulated Hernia.*—Mr. FURNEAUX JORDAN, Assistant Surgeon Queen's Hospital, Birmingham, records (*Medical Times and Gazette*, June 14, 1862) three cases of strangulated hernia in which he unsuccessfully resorted to inversion. Mr. J. remarks that the cases recently recorded in which this surgical remedy has been successfully employed, while none in which it failed have been published, might lead to an undue estimate of the value of this measure. The careful study of his own cases, with the successful ones which have been published, lead him to the following conclusions:—

"1. Inversion may be performed in appropriate cases with efficiency and delicacy, and without detriment to the patient or to subsequent remedial measures.

"2. It should not substitute but be added to the other methods of treatment which precede operative interference.

"3. It will, like the taxis under the complete influence of chloroform, fail in a very large number of cases of strangulated hernia.

"4. It should be resorted to early or not at all.

"5. Inversion ought certainly to be avoided if there be actual or suspected inflammation in the hernial sac or in the peritoneum generally. It should still more urgently be avoided if there is reason to fear a gangrenous state of the bowel. Inversion in such cases would probably tear the intestines in the abdominal cavity from the strangulated knuckle in the sac. In sphacelus of the constricted bowel (I may remark parenthetically) I have freely opened the diseased canal—a point on which all surgeons are agreed; and I have, at the same time, divided the constriction—a point on which, surprisingly enough, all surgeons are not agreed.

"6. Inversion exercised in proper cases and at the proper time facilitates one step in the operation—the decisive and complete return of the bowel after division of the constricting medium.[1]

"7. It is not clear that chloroform may be safely administered prior to inversion of the body. The danger may be twofold: 1. Pressure of the tongue on the epiglottis and upper aperture of the larynx; and, 2. Pressure of the abdominal viscera on the diaphragm, and, therefore, on the lungs and heart. When the body is inverted during chloroformization in cases of foreign bodies in the larynx, most surgeons, I believe, take the precaution of first making an artificial opening in the windpipe."

35. *Local Gangrene treated by Oxygen Baths.* By M. LAUGIER.—M. Réveil has analyzed the gangrenous parts in some patients, and he has arrived at the conclusion that the essential cause of gangrene is a diminution or absence of the oxygen necessary for the integrity of the life of a tissue. This theoretical opinion has hitherto led to no practical benefits; but lately M. Laugier, at the Hôtel Dieu, has founded upon it a mode of treatment which has been highly successful. A patient having one of his great toes partly mortified, and the skin under the ankle painful, altered in colour, and also threatened with gangrene, had his foot placed in a simple apparatus in which the disengagement of pure oxygen kept it continually in a bath of this gas. The rapid result was the arrest of the gangrene, and the return of the threatened parts to the healthy state. The removal of the eschar in the toe ensued, and the cicatrization was almost completed. Another patient came into the hospital attacked with spontaneous gangrene of the two last toes of the left foot; the adjoining skin, as far as the articulation of the foot with the leg, was red, painful, and threatened with mortification. The same mode of treatment was adopted, and after a few days

[1] The absence of this advantage occurred in a marked manner in a case to which I was called in the country, *where inversion was quite out of the question.* An unfortunate difference of opinion between two practitioners caused great delay. Peritonitis supervened. After I had completed the operation the fold of intestine, when returned into the abdomen, remained precisely where it was placed within the inner inguinal ring.

the gangrene remained limited to the parts first attacked. The adjoining skin remained healthy and presented no more redness, the pain was very much diminished, and at the date of the last report there was reason to hope for a favourable result, although the patient, as in the former case, was seventy-five years of age. Hence M. Laugier concludes that, whether the theory advanced be true or not, oxygen baths rapidly arrest, at least in certain cases, the progress of spontaneous gangrene of the extremities.—*B. and F. Med.-Chir. Rev.*, July, 1862, from *Bull. Gén. de Thérap.*, May 30, 1862.

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36. *Contributions to the Statistics of Cancer.*—Mr. W. M. Baker communicated to the Royal Medical and Chirurgical Society (July 8) a paper on this subject.

The cases of cancer from which this paper was constructed were 500 of those recorded by Mr. Paget between the years 1843—1861, and all of which had come under his own observation. Only the external or so called surgical cancers were included in this number. The first part of the paper showed the proportion of cases in each organ and each sex, and the percentage of the several kinds of cancer—each part of the body being attacked, as a rule, by one form of the disease almost exclusively. The greater frequency of cancer in females was found to be due to cases of scirrhus of the breast; in the cases, in almost all the other external organs, especially those subject to epithelial cancer, the proportion of males was greatest. The influence of age was next noticed, and the increasing liability to cancer as people advanced in life; the absolute number among the 500 cases at each age being given, and also the relative frequency in proportion to the whole population living at the same period. In external organs, medullary was found to be the most frequent variety in youth; scirrhus and epithelial in middle and old age. The number of females affected with cancer, in proportion to the whole population, was found to increase rapidly from the earliest age up to 40—50, and then more gradually decline. In males the number increased up to the age 50—60, and after this declined again, the rise and fall being both of them more gradual than in females. The kind of cancer to which each sex was most liable accounted for the difference. The condition of the female patients—whether single, married, or widow—was noticed, and also the influence of each on the production of cancer. The proportion of cases of cancer in the breast was found to be greater in the married than in the single, both absolutely and in proportion to the number in which the two classes exist in the community. The state of health of the patients at the time of the beginning of the disease was ascertained, and found to be good in a very large majority; a rather larger proportion of the medullary and epithelial than of the scirrhous being in bad health at this date. The question of cancerous inheritance was in the next place considered, and answered in the affirmative, 24 per cent. of the patients giving a history of cancer in other members of the family; the percentage, too, in the private cases, in which the family history would be better known, was considerably greater than in the hospital. The variety of cancer was not always the same in all the members of the family attacked. Tables of the date of recurrence after operation were given, and the several kinds of cancer compared in this respect; the average number of months which elapsed between the date of removal of the primary disease and the recurrence, was greatest in scirrhous, and least in epithelial, but a larger proportion of cases of the last variety remained without any recurrence for a period far beyond the average. The date of recurrence after early and late operation was compared; the difference between the two being but small, probably from the acute cases being the earliest to be removed and to return. One or two of the cases, remarkable by their long-deferred recurrence were given more in detail. The last part of the paper was devoted to considering the duration of life, especially with the object of comparing the cases of operation with those in which the primary disease was not removed. The greatest difference in the two sets of cases was found to exist between the epithelial cancers, and the least between the medullary; but a marked increase of life on the side of the operations was present in all the varieties. Part of this result is, of course, due to the selection of cases for operation. Some of the organs were compared separately, and the

same advantage on the operation side was shown in each, with one exception—viz., the bones, in which the duration of life was exactly the same on both sides. The influence of early and late operations in respect to the duration of life was also considered, and as in the recurrences, only a slight difference was observed; indeed, the length of life was greater in the cases in which the operation was performed at two to five years after the first observation of the disease than in those at one to twelve months, the former being all chronic cases. Lastly, the duration of life in the hospital and private cases was compared, and the advantage shown to be on the part of the hospital. Some of this difference may, however, be accounted for by a large number of the hospital cases being submitted to operation.—*Med. Times and Gaz.*, July 19, 1862.

OPHTHALMOLOGY.

37. *Amaurosis consequent on Acute Abscess of the Antrum, produced by a Carious Tooth.*—Mr. S. J. A. SALTER read before the Royal Medical and Chirurgical Society (June 24) a paper based on a case of this kind of unusual severity and of exceptional complications. The patient, a young woman, 24 years of age, was attacked with violent toothache in the right upper first molar, which was followed by enormous swelling of the side of the face, and intense pain. The eyeball then became protruded, and she soon after perceived that the eye was blind. Shortly after the establishment of these symptoms, "abscess" of the antrum pointed at the inner and then at the outer canthus, and a large discharge of pus at both orifices followed; these orifices soon closed, and the general symptoms of the part continued unchanged—the swelling of the face, protrusion of the globe, and blindness. This state of things lasted for about three weeks, when the patient was sent to Guy's Hospital, and admitted. At this time the patient exhibited hideous disfigurement from swelling of the face, œdema of the lids, and lividity of the surrounding integument. Upon examining the mouth, it was found that the carious remains of the first upper right molar appeared to be associated with, and to have caused the disease. Together with the outer contiguous carious teeth this was removed, and led by an absorbed opening into the floor of the antrum. The hemorrhage which followed the operation was discharged partly through the nose and partly through the orifices in the cheek, as well as from the tooth-socket, showing a common association of these openings with the antrum. The condition of the eye constituted the most important symptom, and the most distressing. The sight was utterly gone: the globe prominent and everted. There was general deep-seated inflammation of the fibrous textures of the eye. The pupil was large and rigidly flexed; it did not move co-ordinately with the other under any circumstances. Some abatement of the symptoms followed the extraction of the tooth; but it was soon found that there was a considerable sequestrum of dead bone, which was removed. The necrosis involved the front part of the floor of the orbit, the upper cheek portion of the superior maxilla, with the infra-orbital foramen, and a large plate of bone from the inner (nasal) wall of the antrum. The removal of the dead bone was followed by the immediate and complete cessation of all inflammatory symptoms; but the eye remained sightless, and the pupil rigidly fixed. About five weeks after the removal of the dead bone, it was noticed that the pupil of the affected eye moved with that of the other, under the influence of light, though vision in it had not returned. The eye was frequently examined at this stage with the ophthalmoscope. All the structures, including the retina, appeared healthy, except the termination of the optic nerve, which was perfectly white and anæmic, while that of the other eye was pink and natural. The author referred to two other cases essentially similar to his own. The first (unpublished) occurred in the practice of Mr. Pollock, of St. George's Hospital. The patient had intense inflammation of the entire maxillary region on one side, caused by a carious tooth. It implicated the whole face and the contents of

the orbit, but was not attended by "abscess" of the antrum or necrosis of bone. The inflammation completely ceased on the removal of the tooth, but the sight was permanently lost; the pupil was at first fixed, but afterwards moved with that of the other eye. Another example, closely resembling these, was published by Dr. Brück, in Casper's *Wochenschrift* for 1851. It was, however, more chronic, and the loss of vision was only temporary. The author concluded his paper by suggesting that the serious ophthalmic symptoms depended on the nerves of the eye being involved in a plastic inflammation in their course, external to the skull, and before their distribution; that the optic nerve was permanently damaged, as shown by the permanent blindness; that the third nerve was temporarily implicated, as shown by the temporary fixedness of the pupil; and the eversion of the eye from the first seemed to indicate that the sixth nerve was less or not at all involved. Finally, the author left it an open question whether the anæmia of the optic nerve, as displayed by the ophthalmoscope, is to be looked upon as a cause or consequence of its suspended function.—*Med. Times and Gaz.*, July 5, 1862.

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38. *Blepharo-spasm.*—Mr. W. White Cooper has recently (*Lancet*, June 14, 1862) published some interesting observations on this troublesome affection.

"He has seen," he says, "very many cases of that troublesome affection of the branches of the facial nerve which causes twitching of the muscles of the eyelids and the face; they have presented themselves in every degree, from the slight, almost imperceptible quiver of the fibres of the orbicularis, known as 'life-blood,' to firm persistent closure of the lids themselves; and I may say that I know of no disorder, not really serious, more distressing to the patient. In two cases there was also spasm of the throat, so that in one, the patient, a lady, uttered from time to time a loud 'cluck,' sufficient to attract attention in the streets; the other sufferer, also a lady, gave utterance to a convulsive sob, especially when nervous or agitated. These sounds were uncontrollable, were increased by the desire to repress them, and together with the facial contortions, led the ladies to seclude themselves from society.

"The 'life-blood' quivering is the most common form; rapid closure of the lids, exactly resembling an intentional 'wink,' is next in frequency. The rarest and most severe form is firm compression of the lids—so firm that an attempt at forcible opening will evert but not raise the lid.

"When the convulsive action implicates the muscles surrounding the globe, the distress is greatly aggravated. A patient of mine suffers from tic douloureux and spasmodic twitching of the muscles of the left side of the face, together with an agonizing sensation, as if the eyeball were forcibly dragged back into the socket.

"I remember a curious case in which the desire for riches proved the source of an unexpected grievance. A gentleman sold an estate for a large sum, which he placed at his banker's till such time as he could invest it profitably. It became a perfect incubus; day and night the subject was uppermost in his thoughts. The desired investment always eluded him, and at length the worry told upon his health, one of the prominent symptoms being convulsive movements of the muscles of the eyelids and left side of the face. He was under my care for some time, but it was not till after a satisfactory investment had been made that the truth was disclosed to me.

"One of the causes assigned for this irritation of the facial nerve is the too free use of stimulants. I certainly have in a few instances thought this to be the case, but in the majority it assuredly was not so; indeed, many of the patients have been most abstemious. Nevertheless, it is a point to be borne in mind, and patients should be directed to be careful as to their diet, and if spirits are indulged in, they should be forbidden; light wines are less objectionable. The treatment which, on the whole, I have found most successful has been, topically, counter-irritation at the nape of the neck and behind the ears (a speedy and powerful rubefacient is pepper sprinkled on a wet rag and applied to the skin; it is more cleanly and even more active than a mustard plaster), and friction of those parts with an embrocation composed of one part of extract of belladonna, one part of soap liniment, and two parts of cajeput oil.

"It is not, however, on local treatment that too much reliance should be placed. The medicines which have appeared to exert most influence have been the ammonio-citrate and citrate of iron combined with the tincture of sumbul and with valerian, the bowels being carefully regulated with mild aperients, such as the aqueous extract of aloes with soap and belladonna. A very constant feature in the worst cases has been a tendency to constipation—a condition which has been decidedly relieved by belladonna. This I had myself noticed, and find the fact confirmed, and thus explained, by Schrœder van der Kolk:—

"'This medicine (belladonna) acts specifically on the intestines. Thus laxatives—for example, watery extract of aloes, with the addition of belladonna—are exceedingly useful in heartburn, spasms, and especially in constipation, which long experience and a great number of post-mortem examinations have satisfactorily proved to me to be almost always dependent on constrictions in the descending colon. This state, moreover, exercises a powerful reflex action on the brain and medulla oblongata, as is shown by the melancholy with which it is so often connected. In these cases the stricture is removed, and the laxatives act infinitely better in consequence of the addition of belladonna. I suspect that it is in this the principal use of the remedy lies, which is recommended by so many in epilepsy, though they do not state the indication for its employment in that disease.'[1]

"In some instances where acidity was strongly marked, alkalies afforded much relief."

[In some cases of this troublesome affection we have found the valerianate of zinc beneficial.—ED.]

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39. *Paracentesis of the Cornea.*—Mr. GEO. LAWSON relates (*The Royal London Ophthalmic Hospital Reports*, Jan. 1862) some cases illustrative of the advantages of tapping the anterior chamber of the eye in cases of sloughing ulcers of the cornea, or of ulcers which refuse to heal under other modes of treatment; in cases of onyx, or of ophthalmitis with hypopion.

"The operation," he remarks, "is a simple one, and best performed by the manner usually adopted by the surgeons at Moorfields, viz., by passing a broad needle through the cornea at its lower margin, keeping the point well forward towards the cornea, to avoid wounding the lens, and then suddenly turning it on its edge so as to allow the aqueous to run off, and rapidly withdrawing it, as soon as the iris approaches the cornea.

"The indications which call for this line of treatment may be briefly stated.

"1st. Increased tension of the globe. The eye, in any of the above-mentioned cases, may have its tension slightly increased, and this seems, in a great measure, to depend on an increased secretion of the aqueous, for the anterior chamber becomes deepened; and this is specially observable when contrasted with that of the other eye, and the iris, instead of presenting a plane surface, slopes backwards.

"2d. Deep ulcers which threaten to perforate the cornea will often rapidly assume a healthy action after the tension of the cornea has been diminished by letting off the aqueous humour; and sloughing ulcers will, under the same treatment, derive similar benefit.

"That this benefit is often only transitory is true, but the operation is so simple, that it may be repeated an indefinite number of times, if the patient after each derives relief.

"3d. In cases of onyx or pus between the laminæ of the cornea, the relief of the tense state of the cornea promotes absorption, and relieves pain, and so places the eye in a favourable condition for complete recovery. An onyx which threatens to burst backwards, can be most safely combated by tapping the anterior chamber of the eye in addition to the use of other remedies.

"4th. This operation relieves pain, and, if carefully and properly performed, can do no harm. The relief of pain is so remarkable, that patients, on their next visit to the hospital, will, unasked for, relate the great benefit they derived from what had been done to the eye; but at the same time they will often state that after about twenty-four hours the pain was nearly as bad as ever. The

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[1] On the Spinal Cord and Medulla Oblongata, p. 275.

truth being that the aqueous had become completely restored, and that the tension which called for the first tapping was as great as ever.

"The operation in such cases should be repeated."

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40. *Periorbitis.*—Mr. W. White Cooper makes the following interesting remarks on this affection: "A rare but very dangerous affection is acute inflammation and suppuration of the cellular tissue of the orbit: primarily dangerous from the tendency of the inflammation to extend to the dura mater; and should this complication be escaped, there is still much risk of caries of the bones of the orbit, leading to tedious suppuration, exfoliation, and possible deformity.

"Two fatal cases are recorded by Dr. Abercrombie;[1] death in each case followed acute inflammation of the dura mater. In one, a lad of fifteen, the frontal bone was found denuded and carious to a considerable extent, and the upper and back part of the orbit was also denuded. In the other case, the suppuration was limited to a circumscribed cavity in the orbit, without disease of the bone.

"A very marked example of this disease came under my notice during the past winter. It occurred in the practice of Mr. Joyce, of Berkeley-gardens, who informed me that he was summoned to the patient, a fine boy sixteen months old, in consequence of his having passed a restless night, tossing and screaming much. The only thing noticeable was a peculiar haziness of the left eye. Mr. Joyce at first suspected measles, but in the evening observed that the lower eyelid had begun to swell, which swelling increased with extraordinary rapidity. The treatment adopted was most judicious; nevertheless, the tumefaction increased, and I was summoned about thirty-six hours after the commencement of the attack. My first impression was that the case was purulent ophthalmia, so closely did the livid, enormously swelled eyelids resemble that disease. The total absence of discharge at once dissipated the idea, and on close inquiry it appeared that about a month previously the child had suffered from a carbuncle, that he had never since been well, starting and screaming in his sleep, with other indications of constitutional disturbance. The conclusion arrived at by Mr. Joyce and myself was, that there was diffused cellular inflammation of the orbit. Active measures were adopted, nevertheless the child became drowsy, delirious, and unable to recognize those about him. The symptoms being thus grave, the assistance of Dr. Sibson was obtained, and the alarming cerebral disturbance subsided under brisk purgation, counter-irritation of the back, &c. The swelling of the eyelids increased, there was great chemosis, and the eyeball became projected forward and motionless. Under these circumstances, I made a deep incision beneath the eye, carrying it well into the orbit, from which issued a large quantity of thin pus. Marked relief followed, the tumefaction gradually subsided, and in the course of a few days the eye recovered to a considerable extent its position and power of motion, although purulent discharge continued for some weeks; this, however, ceased on the exfoliation of a fragment of bone about the size of a threepenny-piece, evidently part of the floor of the orbit. When I last saw the child, on the 27th of March, slight thickening of the lower lid, but without eversion, was the only indication of this formidable attack.

"I have seen several instances of orbital inflammation with effusion without proceeding to suppuration. In every case the patients have been much out of health, and with feeble circulation. The symptoms have been deep-seated pain in the orbit, swelling of the lids, and protrusion of the eye, with much serous chemosis. The movements of the globe were impaired. Full doses of opium, with quinine and steel, appeared to act more beneficially on these cases than depletion. The recovery is usually gradual, a considerable time elapsing before the eye recovers its full mobility and perfect position. A person once the subject of this attack is liable to a recurrence."

Mr. Cooper says that he has "also seen several cases of chronic periorbitis; and the remedy which afforded marked and very decided relief was the iodide of potassium combined with sesquicarbonate of ammonia; but the iodide re-

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[1] Pathological and Practical Researches on Diseases of the Brain, &c. Third edition, p. 28.

quired to be given in doses of five grains thrice daily: smaller doses did not produce any marked effect. It is best to order this medicine to be well diluted and taken soon after a meal. I can also speak favourably of iodide of sodium, which appears to depress the system less than iodide of potassium, and is less liable to create that distressing flux from the nose often caused by the latter. One point is deserving of attention: these salts should never be prescribed with *liquor* cinchonæ and water, or an insoluble deposit—iodide of quinine—will be thrown down. If the *tincture* of cinchona be used, this does not take place, the spirit retaining the iodide of quinine in solution."—*Lancet*, June 7, 1862.

[We have now under our care a case of chronic periorbitis, which is interesting from the fact that the patient suffered from a previous attack nearly fifteen years ago, and, after an interval of fourteen years, has had a recurrence of it. He is taking the syrup of proto-iodide of iron with advantage.—EDITOR.]

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41. *Epiphora.*—Mr. W. WHITE COOPER expresses the opinion (*Lancet*, June 7, 1862) that "slitting up the canaliculus is a valuable operation," but he says it "disappoints expectations in one class of cases; at least, such has been the statement of several patients who have consulted me after having undergone the operation. The cases to which I refer are those in which no inconvenience is experienced when the patient is in a warm room or still atmosphere, but exposure to cold, especially damp cold wind, excites a profuse watering of the eyes, which is a source of great discomfort. It appears to me that in such cases the fault is less in the tear-ducts than in the secreting organs; in other words, it is not that the channels are morbidly contracted, but that the flow of tears is too great, and is due to an extreme sensibility of the surface of the eyes from undue excitability of the branches of the fifth pair of nerves, whereby the lachrymal gland is over-stimulated. The treatment should be directed to this point.

"As a rule, I am by no means an advocate for covering the eyes too much, and think that the very general custom of wearing veils is productive of more harm than good. But much comfort is derived in the cases in question from the use of a gauze shade to protect the eyes from the current of cold air. By some patients preference is given to protectors, the glass being encircled with gauze side-pieces; this material is preferable to metallic wire, which is too heavy, and is too much influenced by temperature. I disapprove of the metallic wire eye-protectors, which are joined together and fixed on the head by elastic bands. The pressure of the frames against the edge of the orbit is painful, and the constriction of the band around the head is absolutely hurtful."

[It seems to us that the only class of cases in which slitting up the canaliculus—an operation so indiscriminately now practised in England—can be regarded as useful, is where the lower punctum is everted so as to be incapable of performing its functions. In other cases we conceive dilatation to be preferable, for we have found the canaliculus to be as easily dilated as any part of the lachrymal passage.

We can add our testimony to that of Mr. Cooper as to the injurious effect of the elastic bands of the wire eye-protectors. We always advise our patients who require those protectors to eschew the elastic bands, and to use such as are fixed to frames like ordinary spectacles. These stand out a short distance from the eyes, and allow of the circulation of air, and do not constrict the head like the elastic bands.—EDITOR.]

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42. *Intra-ocular Effusions and the Ophthalmoscope.* By W. WHITE COOPER, Esq.—"There are no cases in which the advantage of the ophthalmoscope is more marked than those where the sight has been injured by deep intra-ocular effusions. The diagnosis of such cases is truly important; there is probably nothing abnormal in the external aspect of the eye—nothing beyond some inactivity of the pupil to indicate the serious, too often irreparable nature of the lesion. The following illustrates the point:—

"A young gentleman had been educated for the army, and in due course presented himself for examination before the military surgeons. When the sight was to be tested, the surgeon placed his hand before the youth's left eye, when

lo! he could discern nothing with his right. Another surgeon was called in, and, after consultation, it was agreed to suspend for six months the final decision as to his eligibility. Deeply mortified and concerned by this unexpected discovery of his son's blindness, the youth's father brought him to me the following day. He was a remarkably fine young man, and there was nothing to be seen under ordinary examination which explained his absence of sight. The only circumstance bearing on it which he could remember was a severe blow on the eye from a cricket-ball some six months previously. The ophthalmoscope at once revealed the nature of the case. There was no retinal reflection whatever; a clot of greenish hue, doubtless blood poured out at the time of the blow, occupied the posterior portion of the vitreous chamber, and completely prevented all vision. I was obliged to express an unfavourable opinion as to the probable restoration of sight; when a clot has remained so long, with little change beyond the loss of the red particles, there is small hope of its removal. The difference between the activity of absorption of blood from the aqueous chamber and the vitreous chamber is very great; I have seen the aqueous chamber cleared in twenty-four hours. Slow, on the other hand, is the disappearance of even a small effusion, when poured into the vitreous chamber; and when the effusion is between the choroid and the retina, the latter is detached, and the mischief irreparable. Of this, two examples have recently fallen under my notice.

"A clergyman underwent violent excitement, which was followed by sudden extinction of sight in the axis of vision of the right eye. No improvement took place under treatment, and as his professional prospects were likely to be materially influenced by this calamity, it was important to ascertain the precise nature of the lesion, for which purpose he came to town. On testing the sight I ascertained that the retina was perfect towards the temporal and nasal sides, but insensible to impressions in the centre. The ophthalmoscope showed the retina projecting as a pouch at this point, effusion having taken place between it and the choroid.

"During the last autumn a gentleman was struck by a shot on the temporal side of the left upper eyelid; the shot did not penetrate the globe, but passed on, and lodged on the inner side, where it could be felt between the eyeball and tendon of the orbicularis. The point of interest was this: the eye had not suffered where the shot had first struck, but on the opposite side sight was extinct. The ophthalmoscope discovered detachment of the retina at that spot. Query, Had the rebound of the shot from the bone struck the eye so sharply as to cause this? That was my impression after careful examination.

"In contrast to these cases stands the following, recently seen by me in consultation with Dr. Cape. A young nobleman, who had always suffered from weak sight, received an accidental blow upon the right eye. Two days afterwards it was found that he could only distinguish light from darkness with that eye. The question arose, Was this loss of sight the result of the blow or not? The ophthalmoscope decided in the negative, for the eye appeared perfectly healthy, and there was a total absence of effusion. Dr. Cape agreed with me in the opinion that the blindness following the blow was merely a coincidence, and that pain in the head and other symptoms indicated that the brain was the seat of mischief. In this view we have been confirmed by the improvement which has taken place under depletion, blistering the nape of the neck, and a course of mercury; the sight is steadily returning."—*Lancet*, June 14, 1862.

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43. *Atropia Paper.*—Mr. Streatfield recommends (*London Royal Ophthalmic Hospital Reports*, Jan. 1862) as a convenient substitute for the solution of atropia, a green-coloured tissue paper imbued with the solution of atropia and dried. Such paper is more readily carried about in the pocket than a bottle of the solution. "The little piece of paper to be used, one-fifth of an inch square," he says, "is taken up on the tip of the forefinger, previously damped, and the patient's lower lid being drawn down, he is told to look upwards and the scrap of paper is put on the sclerotic conjunctiva below the cornea almost without the knowledge of the patient; the lid is then let go, and the piece of paper is left between the ocular and palpebral conjunctivæ; a handkerchief is then tied over the eye that

the lids may be kept closed for awhile." Mr. S. says that this acts quite as well as the common solution.

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44. *On the Advantages of having Eye-instruments Gilt (especially some of those employed in Iris-operations), with a note concerning Non-metallic Instruments.* By Mr. STREATFIELD.—"Occasionally we may see an instrument used in ophthalmic surgery that has been gilt, but this distinction seems to have been without any other purpose than that of ornament. No one eye instrument, that I know of, is *always* gilt,[1] nor is any one *class* of instruments commonly thus distinguished, but there are practical advantages in having a gold surface, to some of them at least, that I have learned not to neglect. The first instrument I have had gilt was my spatula-hook, for in the operation of corelysis, when the instrument, passed behind the pupil, is in apposition with the lens, it is not easy to tell, and it is so much the more important to know the exact position of the instrument and the direction it is made to take.[2] I found, as I expected, that in using this instrument it enabled me to see better what I did in all that I had to perform. Then I had an iris-hook gilt, and, for the operation in which it was employed, I again found the advantage of the yellow metal, and now I intend to have the canula-forceps and scissors and other iris instruments coated in the same manner. I am inclined to think that at least all instruments used for operating on parts within the eye should be gilt—the cutting instruments may be an exception—but of those that can be gilt the lighter colour will make them much to be preferred to the dark polished surface of steel. In an operation, there are two reasons why a steel instrument is not easily seen in the eye—it is so dark that, in the anterior chamber, it probably does not contrast well with the colour of the iris, and it has so smooth a polish that, in the deeper parts of the eye, it does not generally reflect enough light. In the aqueous chambers its highly polished surface reflects the light very strongly from some one part or another of the instrument (it is not always easy to tell whence it comes), or the instrument cannot be well seen because the light is hardly at all reflected from it. A surface of gold is perfect with a much less degree of polish, for it will not rust, which is another especial advantage for eye instruments, because of the tears and other watery fluids with which they are brought into contact; for this reason, eye instruments generally, being so small, would be kept in better order if they were gilt. Steel, even with care, will rust if there is any want of smoothness on its surface. Dull gold, on an instrument of polished steel, will show light whichever way the instrument is held.

"I do not know why any small blunt instruments which we employ should be always of steel or any other metal, and therefore, wishing to have a spatula-hook to be as conspicuous as possible in contrast with the iris and its brown adhesions, I have had one made of ivory, and although it is so very small it is tough, and very little strength is required in it, as, for other reasons, no force may be used in the detachment of iris adhesions. In corelysis lately, I have employed this instrument, and have found it practically answer my purpose better than any other that I have of metal."

MIDWIFERY.

45. *Turning in Cases of Disproportion between the Fœtal Head and the Pelvis of the Mother.*—Dr. M'CLINTOCK read before the Obstetrical Society of London (July 2, 1862), a valuable practical paper on this subject. This paper embodied the results of seventeen cases which came under the author's care in

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[1] Unless it is the director for the operation of "slitting up" the canaliculus; the *probes* that accompany it should rather be gilt, for a practical purpose, because, left in the nasal duct, they often become blackened.

[2] See vol. ii. p. 324.

the wards of the Dublin Lying-in Hospital. In each of them turning had been performed, at various periods after the commencement of labour, on account of disproportion between the head and pelvis. In none of these cases was there any considerable deformity of the pelvis, though the obstetric histories of the women clearly showed that there must have been some slight narrowing of the superior strait. More or less difficulty was experienced in every instance in bringing down the head into the pelvis, and twice craniotomy had to be resorted to. On one occasion the parietal bone (that next the sacrum) was fractured in pulling the head through the brim of the pelvis. With one exception, all the patients were deeply chloroformed before the operation of version was undertaken. Nine of the children—viz., four boys and five girls—survived birth, though all were alive when the operation was commenced. Of the eight children dead born, five were boys and three girls. The heart continued to pulsate for several minutes after birth in some of the children recorded as "dead born," Dr. M'Clintock not considering a child as saved by an obstetric operation, nor recording it amongst the "live births," unless respiration be fully established. All the women recovered satisfactorily but one, who died of puerperal fever, of which some cases had occurred at the time in the hospital. In reviewing these cases, Dr. M'Clintock expressed his opinion that the operation was not so favourable for the child as some of its advocates had supposed, and that it was only when the amount of pelvic narrowing was very slight that we could reckon with any degree of certainty upon saving the fœtus. He would not, therefore, recommend the operation in preference to the induction of premature labour in cases where an option was left us, and a decided contraction of the pelvis was known to exist. At the same time, that it was a valuable resource in cases of this class which may have reached the full period of pregnancy, he proved by the fact, that of eighteen boys born to the above patients, and delivered by other modes than turning, only two were alive at birth; whereas four out of the nine delivered by turning survived their births. Looking to the interests of the mother, the author of the paper considered that the operation of turning in the particular class of cases under notice had stronger claims; for not only did it abridge the labour process, which in itself was no small advantage, but it averted the possible contingencies of craniotomy, high forceps operation, or even of rupture of the uterus. Its great mechanical advantage, Dr. M'Clintock thought, was due, not to the position of the head nor its greater compressibility when coming through the pelvis with the base foremost, but to the unlimited amount of force which we can bring to the aid of the uterus by traction on the body of the child.—*Med. Times and Gaz.*, Aug. 23, 1862.

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46. *Inversion of the Uterus occurring Spontaneously Eighty Hours after Delivery.*—Some obstetricians believe that inversion of the uterus is always the result of some cause over which the attendant has control, and that in most cases it is caused by undue traction on the cord. Dr. Radford, however, has clearly established that it may occur spontaneously without any fault of the midwife's, and that it may occur not only immediately after delivery, but also after an interval of some days. Mr. Charles Cowan relates (*Edinburgh Medical Journal*, June, 1862) a case which is conclusive as to this point.

The subject of it was a lady, forty years of age, always in the enjoyment of good health, who was delivered with the forceps, after a pretty smart labour of twenty-four hours' duration, of her first child, a strong healthy boy, at 4 A. M., on Thursday the 15th November, 1861. The placenta was found in the vagina, ten minutes afterwards, and removed. In about half an hour there was slight hemorrhage, which was easily restrained by the application of cold to the pubic region, which caused the uterus to contract firmly: a little brandy was likewise administered, as I attributed the hemorrhage to the weak state of the patient, occasioned by the protracted labour, and by my efforts to accomplish delivery with the forceps, which occupied me more than half an hour.

I remained with her an hour longer; and to satisfy myself that all was right I removed the bandage, and, on manipulating the abdomen, I discovered the uterus firmly contracted, about the size of a cricket ball, in its normal situation.

The bandage having been replaced I administered a dose of morphia, and took my leave.

For the first three days after her confinement, we have the patient giving the most satisfactory evidence of speedily attaining convalescence. The pulse becomes natural; the appetite returns; the secretions are normal; the breasts are distended with milk, and the mother rejoices in the prospect of being able to nurse her child. Her sister finding her so well on the Saturday afternoon (two days and a half after delivery), returns home, and on the Sunday the patient expresses a wish to get up. What could be more gratifying than this? What could more strongly indicate a rapid restoration to health? So far it appears that all is well; but on Sunday at mid-day, about eighty hours after delivery, a change takes place. Eager to test her strength she leaps out of bed, comes to the ground with some degree of violence, staggers to the fireplace, and falls into a chair in a state of syncope.

There had undoubtedly been mischief, and that of no light character, for from this moment a train of symptoms of the most alarming description followed, becoming hourly more and more serious until the cause was discovered in the inversion of the uterus, and replacement was accomplished. She now again began to show some slight signs of amendment, and we cannot but conclude that the inversion was occasioned by the hurried leap out of bed, especially as the unfavourable symptoms presented themselves then for the first time; and we have further proof of this in the amelioration of these symptoms, commencing almost as soon as the displacement of the uterus was reduced.

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47. *Vessels concerned in the Production of Phlegmasia Dolens.*—Dr. Tilbury Fox read a paper (June 4, 1862) on this subject before the Obstetrical Society of London. The author first referred to Dr. Mackenzie's experiments as insufficient to determine the question of the production of phlegmasia dolens, and proceeded to argue that venous obstruction is followed by œdema only; that the action must be the same, whether the obstruction be produced locally or indirectly through a vitiated blood condition. If any difference in the two cases existed, the changes over and above œdema, which characterize the lesion as phlegmasia dolens, must be ascribed to the action of the blood state (which is absent in the locally produced disease) upon the general textures of the limb. If this view be adopted, the influence of the veins is *nil*, and we must look for the explanation in a special action carried on between the blood and the tissues. That the clinical history forbids the acceptance of such a doctrine, inasmuch as the very conditions (viz., blood-vitiation tending to produce "phlebitis") which are regarded as the cause of phlegmasia dolens very frequently exist, and yet are very rarely followed by white leg—for example, in the various blood-poisonings unconnected with the parturient condition. That if produced under the circumstances mentioned, the disease ought not to be so frequently unilateral, nor confined to the lower limbs. That the occurrence of white leg in cases of cancer, phthisis, pressure, etc., could not be explained hereby. That the death-rate of phlegmasia dolens forbade the same interpretation of the phenomena. That in the experiments of the injection of lactic acid into the blood by Dr. Mackenzie, there was no evidence to show that in the dogs operated upon anything but œdema resulted. That the existence of phlebitis, except as the rarest feature, is fallacious in cases of venous disease. Attention was then drawn to the distinction between the coincidences and the essentials of phlegmasia dolens, as in the case of puerperal fever complicated by the latter. For example, take away from the general total of such a case the proper puerperal fever symptoms, and the phlegmasia dolens remains in perfect integrity; *per contra*, take away the hot, white, tense, elastic swelling, and the puerperal fever remains in its entirety. In the combination, however, the pathological changes normal to phlegmasia dolens may be modified by the tissue actions (abscess, etc.), which are the consequences of the existence of a virus in the blood; in uncomplicated phlegmasia dolens, the tissues are passive, so to speak. The succeeding remarks went to show that the theory propounded by White was correct with regard to the nature, though not as to the cause, of phlegmasia dolens; that in the natural condition a large quantity of lymph travels from the limbs towards the thoracic

duct, and when this current is impeded markedly white leg resulted. The case of the absorption of a poison into the cellular tissue (which, according to some, controverts White's opinion) was examined, and it appeared that this might or might not be followed by phlegmasia dolens, according as the obstruction in the lymphatics affected the main current or merely some minor channels (the latter being the rule); the swelling being modified in severe cases, as before observed, by the relative action of the septic blood state and tissues. Cases were quoted to prove that lymphatic obstruction is sufficient, and alone necessary, to give rise to phlegmasia dolens. The paper concluded with the following summary: 1. Phlegmasia dolens is a local disease. 2. No general symptoms need be present (implying absence of blood-poison). 3. Phlebitis, however produced, cannot give rise to phlegmasia dolens, but œdema only. 4. Phlegmasia dolens may occur in, but forms no necessary part of, blood-poisoning (such as tends to phlebitis), but is modified thereby frequently; and any tissue conditions over and beyond the presence of fibrinous serosity, and the consequent hypertrophous state of the areolar tissue, are in nowise essential components of phlegmasia dolens, but common alike to very many different "blood" diseases. 5. Obstruction to the main lymphatic channels alone is capable of giving rise to white leg, and acts by preventing the removal of the lymph from the affected limb. 6. The obstruction may be the result of (*a*) extrinsic pressure; (*b*) thrombosis due to sudden (compensatory) absorption of vitiated fluid after sudden loss of any kind; (*c*) inflammatory changes in the vessels themselves (rare). 7. The effect of the action of venous obstruction upon the phlegmasia dolens is an intensification of the general swelling, and the presence of œdema during the subsidence of the enlargement of the limb. Lastly, a frequent, but unrecognized, source of blood-vitiation was alluded to, namely, in cases where large tracts of cellular tissue were diseased—as in erysipelas, sloughing, cancerous, phthisical, and dysenteric ulcerations, and the like—the lymphatics, charged with *effete* matter, and an excessive number of imperfectly-developed pale cells, formed in their glandular part, poured their contents into the venous system from the thoracic duct; and this might be a cause of thrombosis at the right side of the heart and in the vessels leading to the lung.—*Med. Times and Gaz.*, July 12, 1862.

HYGIENE.

48. *Influence of Railway Travelling on Public Health.*—The Nos. of the *Lancet* for Jan. 4, 11, 18, and 25, Feb. 1 and 8, and March 8, contain an elaborate report of a commission appointed to investigate this subject. It will be seen from the following concluding paragraphs that they consider its influence to be unfavourable:—

"The efficiency of the rapid concussions incidental to railway travelling in developing or aggravating epilepsy, chronic spasm, cerebral softening, and spinal softening, has been studied, not by the light of vague conjecture, but upon the authority of strictly-observed cases in the practice of men such as Sir Ranald Martin, Dr. Brown-Séquard, Dr. Radcliffe, and others. The particular influence of cold and draught has been brought out prominently by Dr. Williams; while this has been placed in necessary juxtaposition with the exact inquiries as to ventilation and relative purity of the air in railway carriages by Dr. Angus Smith. The mischief following from undue retention of the secretions is sufficiently and practically illustrated in the case by Mr. Hilton. The nature of the impressions so well studied by Sir David Brewster has been traced to its pathological consequences by Mr. White Cooper. Dr. Fuller's ingenious observations on the part played by the auditory nerve in conveying to the brain strong and incessantly repeated impressions of sound, are of a practical and suggestive character. This is, no doubt, one cause of the peculiar effects of continued railway travelling, which had not been well known, and of which the mischief is preventable. The almost certainty with which a long railway journey will, in some pregnant

women, produce abortion, has been well illustrated in the communications by Dr. Meadows and Dr. Graily Hewitt. The acceleration of the pulse in railway travelling is one of the indications of the extent to which this form of passive exercise taxes the system; but all physiological deductions require to be received with great reservation, as the disturbing elements are so many and various.

"There are only two classes of persons especially likely to be injuriously affected by moderate railway journeys, even though frequent: they are persons advanced in life and of weakened power, and those who are subject to the special diseases which have already been studied in this relation. The actual exertion, the excitement, the mental strain, the peculiar influences of the motion of a railway carriage, indicate its dangers to those first mentioned. These constitute a small minority. But there are a number of persons who, although not far advanced in age, are yet the subjects of various conditions of ill-health depending on insidious degenerative disease of the brain and heart. The season-ticket holders of the railways are in large numbers men who have passed the best years of their life in hard and exhausting employment of mind and body. They are the successful merchants; the senior partners of flourishing firms, which they have built up by a life of labour; half-retired tradesmen; half-invalid bankers, *et id genus omne*. We can now see that it is by the injuries which have resulted to these men from their constant travelling to and from town that an impression has become current as to certain mischiefs which habitual travelling inflicts. When it is stated that such a banker, who comes up fifty miles three or four times a week, has to lie down half an hour before he can sign a check; that such a well-known chemist has suffered from symptoms of brain excitement since he bought his new house by the sea, and travelled daily to London; or that a certain barrister has found himself obliged to pay for his journey by epileptic seizures, the alarm soon extends beyond reasonable limits. But few men can endure without suffering to travel fifty or a hundred miles daily to their business for any length of time. The influence of the journey itself is heightened by many accessory conditions to which we have adverted; and the present construction of the rails and carriages is such as to deprive the traveller of all those mitigations by which his discomfort might be diminished and his health safe guarded.

"Amongst the unprecedented collection of cases brought under our notice during this inquiry, there have been recorded several of serious mischief, and even death, from persons in ill health hurrying to catch trains and sitting down, heated and breathless, in the draught caused by the moving of the train which they have just managed to be in time for. It is almost exclusively at large termini that these cases have occurred, and that the cause of them obtains. Now, this rushing in at the last moment, we are informed, is becoming more frequent; and consideration of the condition in life of those who constitute the majority of season-ticket holders, would indicate how this evil arises. We believe it would be advantageous to public health and safety, however harsh it may at first appear, that the doors at termini should be closed five minutes previous to the departure of each train, so that sufficient time should be allowed for passengers to quietly settle themselves, and also for the officials, who are often (as one of them graphically expressed it) 'torn to pieces' just at the last moment. It is well known that the difficulties with luggage, which this arrangement would obviate, are frequently causes of delay in starting trains. Then there is high speed to make up lost time, or want of punctuality, both of them fraught with danger to passengers.

"It has been shown that the injurious effects which habitual railway travelling produces on some who escape such influences when only taking occasional journeys are very marked. In such persons, heedless continuance comes to be a cause of disease. In some, there have been no previous symptoms that they could recognize, or such as would have deterred them from undertaking the daily journey; and thus the season ticket is taken, and has soon to be disused. In all cases the evidence points to the conclusion that the injurious influence slowly and gradually increases whilst the cause remains—that tolerance is not established by persistence.

"It is too much the custom, when adopting a country residence on a railway line, to make no arrangements of business according to the diminished time for

work which the daily interval between the morning and evening trains allows. Hence that hurry, anxiety, and working of the brain at high pressure, which, of all things, tends to develop in susceptible persons such injurious effects on health as habitual railway travellers often experience. The remedy for this is obvious: 'Cut your coat according to your cloth'—'Mene tenus propriâ vive'—'Selon le pain il faut le couteau,' are saws proved to be wise. But we believe that no person is justified in undertaking a series of continuous journeys by rail under the conditions alluded to (if under any circumstances), without previously consulting his medical attendant as to their probable effect on his health, the precautions he should adopt, and the warning symptoms which he may not safely disregard."

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

49. *Poisoning with Upas Tieuté.*—Some time since a gentleman of Berlin received from Java some of the arrow-poison, upas tieuté, and fearlessly subjected himself to the action of the poison. He took three grains of the substance, which he found to have a very bitter and slightly saline taste. After having swallowed it, the Doctor felt more cheerful, and a headache which he had had passed off; on the other hand, a feeling of heaviness in the stomach supervened. He soon afterwards left his rooms and went out; and the first sign of the action of the poison having begun, was that on turning round the corner of a street and feeling a strong wind, he perceived a sort of stretching all along the spine. This was half an hour after he had taken the poison. An hour afterwards, on being about to take a cup of coffee, he suddenly felt a violent concussion of the whole body, succeeded by powerful stretchings of all the extremities; at the same time the head was drawn backwards. He endeavoured to speak, but could not open his mouth. This paroxysm soon ceased, but others followed rapidly, either spontaneously or after the slightest stimulus. Consciousness was not in the least disturbed. The fits were not painful, the respiration was not impeded, and the muscles remained quite flaccid after the fits. Swallowing was difficult, and the patient felt very weak. He then desired to be brought to the Charité Hospital, and on being carried down-stairs violent spasms came on; while in the cab which took him to the hospital, he was quite free from them. He was transferred to the clinique of Professor Frerichs, where ipecacuanha and tartar emetic were at once given, as it was supposed that part of the poison might still be in the stomach. Copious vomiting ensued, accompanied by tetanic convulsions, spasm of the glottis and dyspnœa; but the latter ceased with the vomiting. Further convulsive fits followed either spontaneously or on touching the patient's body or the bed, or on suddenly directing a light to the eye. The pulse was 72, and there were no other morbid symptoms. The patient now took ten drops of laudanum every quarter of an hour, and after three such doses, he took fifteen drops every half hour. Having thus altogether taken sixty drops he fell asleep. He perspired freely, and was repeatedly awakened by tension and convulsions of the muscles of the neck and the back; but on taking a few more drops, he soon fell asleep again, and remained so for twelve hours. On awakening the next morning he felt exceedingly weak; there was still some stretching in the muscles of the left side of the neck, but no spasms. The pulse was at 66. Swallowing was still impeded, and the urine passed off with difficulty. This was found to contain strychnia. The laudanum was then discontinued, and the patient merely took wine and easily digestible food. On the third day he was able to leave his bed, and on the sixth his health was quite re-established.

The poison was subjected to examination in the chemical laboratory connected with the hospital. It was contained in a piece of bamboo-cane, and consisted of a coarse-grained reddish-brown substance, in which several shining cystals were seen. On putting some of it under the microscope, amorphous grains and small tetrahedral crystals were discovered. A small trace of this substance gave a strong reaction of strychnia, and it was found that in a hundred parts

of upas, sixty-two parts of pure strychnia were contained, so that the three grains of upas taken by the Doctor were equivalent to about a grain and three-quarters of strychnia. Frogs and a dog, to which some of the poison was given, died in a short time. If woorara had been at hand, it would probably have been administered to the patient, although, on the whole, Professor Frerichs is disinclined to try it on patients, as we have until now no certain data as to the doses in which this powerful drug should be given. The effects of opium were in this case certainly very satisfactory.—*Med. Times and Gaz.*, Aug. 23, 1862.

50. *Strychnia Poisoning.*—M. DURIAU publishes an article in which he comments upon the needless difficulties which have been unfortunately thrown around the subject of strychnia poisoning. He considers that the symptoms produced by the latter are perfectly distinct from any other morbid phenomena, and that the discussions raised upon Palmer's trial, as to whether the symptoms observed might not have been caused by tetanus, hysteria, or the like, were most unnecessary. He illustrates the characters of the strychnia affection by a case which he relates: the following is a *resumé* of the principal facts. The patient was a woman aged 28, who swallowed one-sixth grain of strychnia; in ten minutes the convulsions began; they lasted two or three minutes each, and were separated by intervals of one or two minutes, and always ended in a muscular rigidity of all the body, and especially of the inferior extremities. In these different *crises* she seemed to desire sometimes to get out of bed, but tetanic spasm always hindered her from doing so. Each access of spasm commenced by a slight trembling, analogous to the shivering of fever, which communicating itself by degrees from the extremities to the trunk, was replaced by clonic convulsions, and then by the rigidity already mentioned. Swallowing was impossible, liquid introduced into the throat nearly caused suffocation. Finally, the temperature of the body was elevated, and there was a copious sweat. This condition persisted for sixty-two hours, after which time the patient returned gradually to consciousness. From this time the chief symptom was a burning sensation in the epigastrium and the pharynx, and a complete intolerance of the stomach for all kinds of liquid or solid food; this lasted for not less than six weeks. M. Durian points out that this case, and one reported recently by M. Dauvin, show perfectly the entire distinction that there is between the symptoms of tetanus and strychnia. Besides the obvious difference between the *nervous* symptoms of the two affections, M. Durian directs attention to the stomach disturbance which was present. He declares that this is not an uncommon phenomenon, and that in fact an inflammation of the gastric mucous membrane is not unfrequently produced by strychnia, and leaves its marks after death. M. Durian considers that the use of leeches and of general bleeding is justified in cases of strychnia poisoning where inflammatory symptoms are present, and he justifies himself by quoting Vierordt's experiments, in which it was found that animals who had been bled resisted longer the action of strychnia, and died less quickly than those which had not been bled. In conclusion, M. Durian announces these propositions:—

1. In strychnia poisoning anatomical lesions of the stomach are not rare. 2. Without offering a character which is specific and constant, these lesions are of an inflammatory nature. 3. They are manifestly produced by the action of the poison upon the gastric mucous membrane. 4. They ought never to be neglected in a judicial investigation; for, joined to the symptoms observed during life, they will sometimes lead to a suspicion of poisoning.

M. Durian believes, it may be remarked, that the processes of Staas and Rodgers have rendered the chemical detection of the smallest quantities of strychnia certain.—*Dub. Med. Press*, Aug. 13, from *Annal. d'Hygiène* and *London Med. Review.*

AMERICAN INTELLIGENCE.

DOMESTIC SUMMARY.

Injury of the Arm common to Children of from one to four years of age.—[Dr. R. M. Hodges relates (*Boston Med. and Surg. Journ.*, Sept. 18th, 1862) three cases of an accident often observed in children, and the exact nature of which has probably frequently puzzled the practitioner, in consequence of the impossibility of persuading the little patient to submit to a careful examination, and the suddenness with which the symptoms often disappear.]

Feb. 2, 1862. A nurse, holding the hand of a little girl twenty-eight months old, in a moment of impatience gave it a sudden twitch. The child immediately cried out, would not allow herself to be touched, and held her arm motionless. Her mother, however, placed it in a sling, and three hours after the accident the limb was found in the following condition, viz., bent at an obtuse angle and resting against the body, the forearm much pronated. There was no apparent swelling or deformity, but the slightest motion was extremely painful, and the little patient was unable or unwilling to hold anything in her hand. On manipulating the limb there seemed to be some impediment in its natural movements, and in attempts to produce certain of these a feeling suggesting crepitus was detected, but before either the seat of this, or the actual diminution of mobility could be determined by examination, the abnormal condition of things vanished, the child ceased to cry, took her playthings in her hand, and the limb was evidently once more in its natural condition.

Feb. 7, 1862. A little girl, thirty months old, fell whilst walking across the parlour floor, her mother holding her by the hand. When seen, her limb presented a condition precisely analogous to that described in the preceding case—there was the same pronated and semi-flexed position, the child was unwilling to use it, and cried the moment it was touched. Before I could ascertain what the exact injury was, manipulation had produced the obscure crepitus, or something which seemed like it, the pain and immobility instantly disappeared, the child readily took its playthings, and with the exception of a little fright, was herself again.

These two cases occurred in the course of the same week, and were the first and only ones of the kind which had ever fallen under my observation. I had considered them both as instances of incomplete dislocation of the head of the radius forward. This accident, or, at all events, this phase of it, is not described in the common works on surgery, although a thesis in French, one or two articles in journals, and a description by two or three French writers may be found, in all of which it has been looked upon as some form of dislocation of the upper extremity of the radius. M. Goyrand, of Aix, however, who has written several articles on the subject, takes an entirely different view of the matter. In a paper recently presented to the Surgical Society of Paris (*L'Union Médicale*, Nov. 23, 1861), and which has fallen under my notice since the occurrence of the two cases above described, he sums up the symptoms of this accident so accurately that I venture to quote his description, believing that, in the absence of any readily accessible account of the injury, its recapitulation, with an abstract of some of his remarks, will not be altogether amiss.

A child, from one to three or four years of age, is saved from a threatened fall by being suddenly caught by the wrist, or it is lifted over a gutter, or made to step up by a violent pull of the pronated hand. At the moment of the strain, the person holding the hand notices a slight snap or shock. The child cries out and continues to complain; the limb hangs motionless by the side, a little in front, with the elbow partly bent and the hand pronated. Any attempt to supi-

nate the hand increases the cries, the rotation outwards is brought up by a mechanical obstacle, and if this is not overcome, as soon as the hand is let go it returns to its pronated position. This symptom is pathognomonic. If the resistance is overcome, a snap is heard or a slight jar is felt, pain ceases, motion is restored, and no trace of the accident remains. If nothing is done by the surgeon, after a certain period which varies from a few hours to several days, the limb spontaneously resumes its natural condition, ordinarily during sleep. If any length of time elapses prior to the reduction, either by the surgeon or by the efforts of nature, the hand becomes adducted, and there appears on the dorsal surface of the wrist and the neighbouring parts of the forearm a painful swelling similar to that accompanying fractures, dislocations, or sprains.

M. Goyrand had always considered the lesion in these cases as a partial dislocation of the radius at the elbow, but so slight as to give no appreciable deformity of the articulation. In 1857, a case occurred which revealed to him what he now conceives to be the true nature of the injury, viz., a displacement of the inter-articular fibro-cartilage of the wrist in front of the carpal extremity of the ulna. In complete pronation, the inferior articulating surface of the head of the ulna is exposed behind the corresponding border of the fibro-cartilage by more than three-quarters the thickness of the bone, and hence, in a forced rotation of the radius in the direction of pronation, it is conceivable that the fibro-cartilage may easily be carried in front of the head of the ulna. This displacement occurs only in childhood, as it can only be produced by great violence; in adults, forced pronation is prevented by antagonistic muscles brought into action as soon as pronation becomes painful. This cannot be done by a child. The varying size of the head of the ulna explains why some children, exposed to a cause capable of producing this displacement of the fibro-cartilage, escape the accident.

The following cases are submitted in justification of this diagnosis, and as illustrating the symptoms developed by the accident.

Obs. I. Mary J., one year old, just beginning to walk. July 6, 1861, whilst walking, being held by the right hand, her brother, seven or eight years old, fell heavily against her. The nurse, squeezing its hand, pulled the child quickly towards her, and in doing so felt something "give way" in the little arm. The child immediately began to cry; the limb was held motionless, resting against the body, carried a little in front, and with the forearm pronated. No deformity about the wrist or elbow. Motion or pressure about the elbow causes no pain, but pressure on the back of the wrist makes the child cry out. On supinating the hand, the movement was felt to bring up against some resistance, the child cried louder, and the hand when released assumed its previous pronated position.

The arm being held by the mother, M. Goyrand seized the hand in his right, with the thumb on the lower end of the radius and the forefinger on the head of the ulna; with his left hand he gently supinated that of the child. Before supination was completely effected, the finger resting on the end of the ulna felt a slight shock; instantly the resistance to supination was overcome and reduction accomplished.

Two minutes afterwards the child took in its injured hand a bracelet held out to it by its mother. The mobility was completely regained, and all uneasiness and pain gone.

Obs. II. Margaret D., thirty-five months old, held by the left hand, made a false step, and from the sudden jerk which the hand in a state of pronation received there resulted the injury which M. Goyrand makes the subject of his paper. One of his pupils, a physician in the town where the child's parents reside, being called to the case immediately on its occurrence, recognized the injury and supposed that he had reduced it. The symptoms of the displacement did not, however, disappear, for on the following day the limb was immovable and in a pronated position. M. Goyrand saw the child fifty hours after the accident and noted the following symptoms, viz., those which are mentioned in the previous observation, and in addition, on the dorsal surface of the wrist, a swelling extending to the neighbouring parts of the forearm and hand; this was extremely tender to the touch, especially at a point corresponding to the articular interspace of the wrist. There was a slight inclination of the hand to the ulnar side of the limb. In reducing the displacement, the finger which rested

on the carpal extremity of the ulna felt distinctly, when the hand was brought into supination, a crepitus precisely like that in a case of fracture. Before supination was completely produced the sensation ceased, opposition to supination was overcome, and the reduction was accomplished. Thirty-six hours afterwards no traces of the accident remained.

In both these children the displacement happened again in the same arm. In other cases which have been noticed, the two limbs have been successively the subject of the accident, one after the other.

In the discussion which ensued upon the presentation of this paper, it appears that MM. Guersent, Marjolin, Giraldes, and Velpeau were at a loss to accept M. Goyrand's explanation. M. Guersent believed that the cases in question comprised a variety of lesions with certain identical symptoms. M. Marjolin thought that in many of these cases he had seen a deformity about the elbow. MM. Giraldes and Velpeau thought that a dislocation of the fibro-cartilage could not take place without a lesion of the serous membrane of the articular cavity, after which consecutive symptoms should be developed, no matter how simple the reduction might be. Are we then to accept this explanation of the phenomena presented by this injury?

Although M. Goyrand fortifies his opinion by the results of experiments on the dead subject, he admits that the fibro-cartilage will not remain displaced unless the hand is held up and in forced supination. In two attempts which I have made upon very young subjects, I have not been able to produce this dislocation, nor when the joint was opened have I been able to force the fibro-cartilage into the position which M. Goyrand assumes that it takes, without tearing it from its attachments. Any one who will examine for himself the very limited range of displacement of which this cartilage is capable, except by the use of violence which must determine more marked symptoms than ever follow this accident, will be convinced of the error of M. Goyrand's views. Although no two writers agree upon the precise nature of the injury, all of them, with the exception of M. Goyrand, locate it at the elbow. This diversity of opinion is accounted for by the fact, that before its seat can well be ascertained the symptoms disappear with the very first exploratory manipulations. It would seem, from the weight of testimony and from my own experience, that without attempting to account for this somewhat peculiar, and, as I judge, not unfrequent accident, by any ingenious theory or complicated displacement, a satisfactory explanation of its pathology is to be found in the partial luxation of the head of the radius, which, either in one direction or another, is accepted as its rationale by Duverney, Bouley, Monteggia, Martin, and Fougeu d'Etampes. This view finds support in the position assumed by the arm, and the manner in which the symptoms of the injury disappear. Rotation and flexion (which, of course, if carried through the whole range, implies extension) are the first motions which every surgeon gives to an arm when he examines it for a suspected fracture or dislocation; and in a child, where this bone was but partially out of place, might well be adequate to the reduction, even when practised gently and but a single time. An adult would perhaps unwittingly or of his own accord reduce a dislocation of this slight degree, when in a child, from pain and fear, it might remain persistent till surgical aid arrives. In the absence of this, we are told that in the course of time spontaneous cure is effected. Would this occur if there were so serious a displacement as that of the interarticular fibro-cartilage of the wrist? It appears then that the following opinions present themselves:—

1st. That of M. Guersent, who conceives that the cases in question comprise a variety of lesions with certain identical symptoms. 2d. That of a number of writers, who attribute the symptoms to a partial dislocation of the head of the radius in one direction or another. 3d. That of M. Goyrand, which has been detailed at length.

The cases present too striking a similarity to admit of the acceptance of the first of these, and of the third we have already given our opinion.

The second, therefore, seems to merit the most favourable verdict, and the latitude which it permits is, in the present state of our knowledge, no more perhaps than it is discretionary to allow.

Since writing the above, a third case has fallen under my notice. A child ten

months old was brought to the dispensary, June 24th, 1862, with her hand in a sling, having received an injury to the elbow the afternoon previous, by being lifted up with a jerk by the wrists whilst lying on its back, in which position its grandmother had been putting on a diaper. The symptoms of injury, to wit, crying and inability to use the arm, ensued at once. On examination the following morning, the characteristic position, semiflexion and pronation, and pain on motion, with the absence of deformity or swelling, led me to suspect the nature of the accident, and I was able to satisfy myself that the seat of injury was not at the wrist. The opposition to rotation was evidently at the elbow, and a single sensation of crepitus was felt at this point, but on manipulating to detect, if possible, the condition of the parts, the resistance to supination was unexpectedly overcome and the normal state of things assumed, before I had ascertained what the precise derangement was which stood in the way of free motion. The experience of this case confirms me in my opinion of the erroneousness of M. Goyrand's views, at least in their general application.

Acute Chorea Treated with Whiskey.—Dr. CLARK related to the New York Medical and Surgical Society a case of acute chorea which was interesting from the illustration it afforded of the good effects of what he believed to be an entirely novel treatment in that disease. A girl, sixteen years of age, was admitted recently to Bellevue Hospital suffering from an aggravated form of chorea of four weeks' duration. The convulsive movements were so violent and incessant that she had not slept for four or five nights previous to the admission. Dr. Clark having observed the sedative effects of whiskey administered in intoxicating doses in some cases of idiopathic tetanus, determined to try the same remedy in this case. He directed that half an ounce of whiskey should be given to the patient every half hour until intoxication was produced if necessary and sleep followed. After the third dose the girl slept half an hour, after the fourth dose she slept three hours, and from this time she slept well with doses repeated at longer intervals, and subsequently with the use of tonics has improved rapidly. There were no symptoms of heart disease in this case, and there had been no previous rheumatism of the joints.—*Am. Med. Times*, Aug. 2, 1862.

The Liver in Cholera Infantum.—Dr. J. LEWIS SMITH, Curator of the Nursery and Child's Hospital, has published (*American Medical Times*, Sept. 20th, 1862) some interesting investigations which confirm the prevalent belief that the liver plays an insignificant part in the pathology of the summer complaint of children. "The green stools," he justly remarks, "which have long been referred to the biliary secretion, must be mainly due to causes operating in the intestines, for I have repeatedly noticed that the green colour does not appear till we reach the lower part of the jejunum, or upper part of the ileum. Examined under the microscope the green matter is found to be in little fragments or masses, as if produced in the crypts of the intestines."

Dr. S. gives the result of the post-mortem appearance of the liver in thirty-seven cases. No evidence is afforded by these of any congestion, or torpidity, or hyperactivity, or perverted secretion, or abnormal size of the liver. "In most of the cases the liver was examined microscopically, and the only fact worthy of note observed was the variable amount of fatty matter. Sometimes it was in excess, sometimes in moderate quantity, or rather deficient, and sometimes, apparently, in greater amount in one portion of the organ than in others."

Oakum as a Substitute for Lint, in Gun-shot and other Suppurating Wounds.—Dr. LEWIS A. SAYRE recommends (*Am. Med. Times*, Aug. 9, 1862) picked oakum as a substitute for lint, in all cases of suppurating wounds, particularly in connection with opened joints, where the suppuration is excessive. The oakum, he says, is more of an absorbent than lint, and therefore fulfils one of the objects of dressing better, and another advantage is its cheapness.

"It is necessary," he says, "to place under the wound a piece of India-rubber cloth, or oiled muslin, for the sake of cleanliness; and in case of much inflammation, by simply wetting the oakum in cold water, and wrapping the oiled muslin around the limb, or wounded part, so as to exclude the air, you have at once the

neatest and most comfortable poultice that can be applied to it. In gun-shot wounds, which go through and through a limb, particularly if made with the 'Minié ball,' the whirl or screw of the ball entangles in its thread the muscular fibres and cellular tissue, and separates them from their attachments for a long distance from the real track of the ball itself.

"As the muscle and tegumentary tissues are more freely supplied with bloodvessels than the fat and cellular tissue, the consequence is that they begin to granulate much more readily than those other tissues, and will thus often close up the wound, and prevent the free escape of pus, before those parts have perfectly healed, and thus lead to the formation of extensive secondary abscesses. I, therefore, in all cases where no bloodvessels prevent it, pass an eyed probe through the wound and draw through it a few fibres of the oakum or tarred rope, which keeps it perfectly free, and the tar is a very excellent antiseptic, and removes all unpleasant odour.

"A few fresh fibres are twisted on the end of the seton at every dressing and drawn into the wound, and the soiled piece cut off and removed with the dressings."

Experiments on the Formation of Infusoria in Boiled Solutions of Organic Matter, enclosed in Hermetically Sealed Vessels, and supplied with Pure Air.—Dr. Jeffries Wyman relates (*American Journal of Science*, July, 1862) some very ingenious and interesting experiments to elucidate this subject.

Pasteur, in his admirable researches on fermentation, has brought forward experimental evidence to show that this process depends upon the presence of minute organisms in the fermenting fluid, and that the source of all such organisms is the atmosphere. In support of this opinion he asserts, that when a fluid containing organic matter in solution is put into a flask, and "boiled two or three minutes," and supplied only with air which has been filtered by passing through a tube heated to redness, and the flask is then hermetically sealed, no fermentation takes place, no organisms are formed, and that the contents remain indefinitely without change. But if the same solution is exposed to the air in its ordinary condition, it becomes filled with various living forms. Out of a large number of experiments prepared in the manner above described he has not known one to give a different result from that mentioned. He further states that if the neck of the flask is drawn out into a very slender curved tube of several inches in length, the contents boiled, and then allowed to cool without the end of the tube being closed, so that the air enters at the ordinary temperature, and has free access to the interior of the flask, even then no fermentation takes place and no organisms appear. His explanation of this is, that the air which enters first, meets with the hot steam, and the spores or organisms contained in it are killed; while those which enter the tube later move more slowly, and are deposited on the moist walls of it without entering the body of the flask.

The results of Dr. Wyman's experiments have been quite different, and living organisms have made their appearance, in some instances, where even greater precautions were taken than those mentioned by Pasteur. "The boiled solutions of organic matter made use of," by Dr. W., "exposed only to air in hermetically sealed vessels, and exposed to boiling water, became the seat of infusorial life.

These experiments, Dr. W. observes, "throw but little light on the immediate source from which the organisms in question have been derived. Those who reject the doctrine of spontaneous generation in any of the forms in which it has been brought forward, will ascribe them to spores contained either in the air enclosed in the flask, or in the materials of the solution. In support of this view it may be asserted, that it has been proved by the microscopical investigations of Quatrefages, Robin, Pouchet, Pasteur, and others, that the air contains various kinds of organic matter, consisting of minute fragments of dead animals and plants, also the spores of cryptogamous plants, and certain other forms, the appearance of which, as Quatrefages says, suggests that they are eggs. We have made some examinations of our own on this subject, but it would be unnecessary to give the results in detail. We will simply state, that we have care-

fully examined the dust deposited in attics, also that floating in the air collected on plates of glass covered with glycerine, and have found in such dust, in addition to the debris of animal and vegetable tissues, which last were by far in the greatest abundance, the spores of Cryptogams, some closely resembling those of Confervoid plants, and with them, but much less frequently, what appeared to be the eggs of some of the invertebrate animals, though we were unable to identify them with those of any particular species. We have also found grains of starch in both kinds of dust examined, to the presence of which Pouchet was the first to call attention. When compared with the whole quantity of dust examined, or even with the whole quantity of organic matter, both eggs and spores may be said to be of rare occurrence. We have not in any instance detected dried animalcules which were resuscitated by moisture, and when the dust has been macerated in water, none have appeared until several days afterwards, until after a lapse of time, when they would ordinarily appear in any organic solution.

"Those who advocate the theory of spontaneous generation, on the other hand, will doubtless find, in the experiments here recorded, evidence in support of their views. While they admit that spores and minute eggs are disseminated through the air, they assert that no spores or eggs of any kind have been actually proved by experiment to resist the prolonged action of boiling water. As regards Vibrios, Bacteriums, Spirillums, etc., it has not yet been shown that they have spores; the existence of them is simply inferred from analogy. It is certain that Vibrios are killed by being immersed in water, the temperature of which does not exceed 200° F. We have found all motion, except the Brownian, to cease even at 180° F. We have also proved by several experiments that the spores of common mould are killed, both by being exposed to steam, and by passing through the heated tube used in the experiments described in this article. If, on the one hand, it is urged that all organisms, in so far as the early history of them is known, are derived from ova, and therefore from analogy, we must ascribe a similar origin to these minute beings whose early history we do not know, it may be urged with equal force, on the other hand, that all ova and spores, in so far as we know anything about them, are destroyed by prolonged boiling: therefore, from analogy we are equally bound to infer that Vibrios, Bacteriums, &c., could not have been derived from ova, since these would all have been destroyed by the conditions to which they have been subjected. The argument from analogy is as strong in the one case as in the other."

Singular Case of Hernia.—Prof. PARKER related the following singular case of hernia to the New York Medical and Surgical Society (December 31, 1861).

A young man, enjoying vigorous health, complained for the first time of severe abdominal pain around the umbilicus and in the right groin, and some sickness of the stomach, on Monday morning. This not yielding to ordinary remedies, a physician was called, who regarded it as a case of colic, and treated it accordingly. The pain, constipation, and nausea continuing, Dr. Parker was called in consultation on Thursday. He found the patient with a rapid feeble pulse, cool surface, a somewhat tumid abdomen, with tenderness in the right hypogastrium, pain, singultus, and nausea with vomiting. On closer examination, an oblong tumour, soft and doughy to the feel, and somewhat discoloured, was found extending from the external abdominal ring upwards and outwards on the right side three and a half inches towards the anterior superior spinous process of the ileum. An examination of the scrotum showed that the testicles had never descended into their vaginal sacs. It was at once decided to cut down upon the tumour. The incision was made along the long axis of the tumour. Cutting through the integument and the common fascia, the tendon of the external oblique was divided, and the sac exposed as well as the right testis. The sac was reversed and extended towards the anterior superior spinous process. About ten inches of the ileum had escaped. It was very dark. The finger was passed in towards the internal ring, which was unusually deep, and the stricture torn with the finger. The gut brightened immediately, and was reduced without difficulty. The patient has probably done well, Dr. P. having heard nothing since the operation, three weeks ago.—*Am. Med. Times*, Sept. 13, 1862.

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UNIVERSITY OF PENNSYLVANIA.

At a Public Commencement, held March 13, 1862, in the Musical Fund Hall, the degree of Doctor of Medicine was conferred by Rev. Daniel R. Goodwin, D. D., Provost, upon the following gentlemen; after which an Address was delivered by Joseph Leidy, M. D., Professor of Anatomy.

NAME.	TOWN OR P. O.	COUNTY.	STATE.	SUBJECT OF THESIS.
Aiken, John	Chester Valley,	Chester,	Pa.	Dysentery.
Bailey, W. D.	Dillsburg,	York,	Pa.	Typhoid or Enteric Fever.
Barber, John	Mercer,	Mercer,	Pa.	Medicine Clinique.
Bartine, D. H.	Philadelphia,		Pa.	Development of Mind and Body.
Batdorff, Daniel T.	Mt. Etna,	Berks,	Pa.	Enteric Fever.
Beveridge, Thomas T.	Andover,	Victoria,	N. B.	Acute Bronchitis.
Black, John J.	New Castle,	New Castle,	Del.	Diabetes, with a Review of Dr. Povey's New Theory in regard to the Saccharine Functions of the Liver.
Blackwood, Wm. R. D.	Philadelphia,		Pa.	Gastro-intestinal Digestion.
Boardman, C. H.	Philadelphia,		Pa.	De Novo Anæsthetico.
Bolles, Lucius S.	Providence,	Providence,	R. I.	Infant Alimentation.
Boyer, S. P.	Reading,	Berks,	Pa.	Scope of Surgery.
Brendle, George F.	Rehrersburg,	Berks,	Pa.	Fracture of the Cranium, producing compression of the Brain.
Brown, J. Morris	Cincinnati,	Hamilton,	Ohio.	Respiration, with its Effect upon Nutrition.
Bruch, W. J. H.	Phillipsburg,	Warren,	N. J.	Prostatorrhœa.
Buchanan, Jas. A., Jr.	Philadelphia,		Pa.	Erysipelas.
Buchanan, Wm. F.	Philadelphia,		Pa.	Oleum Terebinthinæ.
Campbell, Wm. H.	Philadelphia,		Pa.	Variola.
Carll, George G.	Salem,	Salem,	N. J.	Gunshot Wounds.
Cleemann, Richard A.	Philadelphia,		Pa.	Heat Depression.
Clement, James M.	Lombardville,	Cecil,	Md.	Predisposition to Dental Caries.
Comly, Ezra, Jr.	Byberry,	Philadelphia,	Pa.	Administration of Medicine.
Dexter, Geo. B.			Nova Scotia.	
Dick, George H.	Philadelphia,		Pa.	Phthisis Pulmonalis.
Dickey, Robert	West Chester,	Chester,	Pa.	Enteric or Typhoid Fever.
Dieffenderfer, E. L.	Bloomsburg,	Columbia,	Pa.	Bronchocele.
Dodd, Edward	New York,		N. Y.	Fractures.
Drane, Henry A.	Philadelphia,		Pa.	Morbus Coxarius.
Drown, Thomas M.	Philadelphia,		Pa.	Urological Chemistry.
Du Bois, Frank L.	New London,	Chester,	Pa.	Delirium Tremens.
Eckstein, H. C.	Philadelphia,		Pa.	Contagion and Infection.
Flynn, John	Philadelphia,		Pa.	The Encephalon.
Frink, Edward A.	South Deer Isle,	Hancock,	Me.	Typhoid or Enteric Fever.
Gibson, J. R.	Philadelphia,		Pa.	Fatty Degeneration.
Good, James M.	West Chester,	Chester,	Pa.	Iritis.

NAME.	TOWN OR P. O.	COUNTY.	STATE.	SUBJECT OF THESIS.
Gross, Henry S.	Philadelphia,		Pa.	Variola.
Guth, Edward F.	Philadelphia,		Pa.	Gonorrhœa.
Hallman, N. F.	Slatington,	Lehigh,	Pa.	Diphtheria.
Handy, D. Claude	Annapolis,	Ann Arundel,	Md.	Modus Operandi of Medicines.
Hickman, Napoleon	Lewes,	Sussex,	Del.	Anæmia.
Hixon, Lloyd W.	Lowell,	Middlesex,	Mass.	Rachitis.
Holbrook, Silas P.	North Wrentham,	Norfolk,	Mass.	The Alimentary Canal and its Functions.
Jack, J. A.	Pottstown,	Montgomery,	Pa.	Delirium Tremens.
Johnson, Wm. H.	Philadelphia,		Pa.	Circulation of the Blood.
Kauffman, J. H.	Minersville,	Schuylkill,	Pa.	Diseases and Injuries peculiar to Coal Mines.
Kendall, Lucian H.	Reading,	Berks,	Pa.	Medical Observations among the Japanese.
King, Robert D.	Amherst,	Cumberland,	N. Scotia.	Puerperal Uterine Hemorrhage.
Kratz, Harvey	Plumsteadville,	Bucks,	Pa.	Diphtheria.
Laros, John A.	Coopersburg,	Lehigh,	Pa.	Diphtheria.
Light, Abia H.	U. S. A.			Enteric Fever.
Long, Manoah S.	Long Swamp,	Berks,	Pa.	Physical Diagnosis.
Maas, Abraham	Philadelphia,		Pa.	Caloric as a Remedy
Magoffin, Montrose M.	Mercer,	Mercer,	Pa.	Infantile Hygiene.
McBride, J. A.	Philadelphia,		Pa.	Labor.
McClure, Allan A.	Nassau,	New Providence,	W. Ind.	Yellow Fever.
McMurtrie, Daniel	Danville,		Pa.	Professional Relations.
Merillat, Wm. C.	Staunton,	Augusta,	Va.	Blindness.
Middleton, P.	Darby,	Delaware,	Pa.	Digestion.
Miles, Samuel N.	Maugerville,	Sunbury,	N. B.	Diphtheria.
Miller, S. J. Fergus	Washington,	Fayette,	Ohio.	Death.
Nebinger, George W.	Philadelphia,		Pa.	Scarlatina — Its Treatment.
Noyes, Hiram J.	Haverhill,	Essex,	Mass.	The Circulation of the Blood.
Nonamaker, J. H.	Fisherville,	Dauphin,	Pa.	Curatio Contrarionem per Contraria.
O'Farrell, Gerald D.	Philadelphia,		Pa.	Typhus Fever.
Orendorff, Charles	Delavan,	Tazewell,	Ill.	Indigenous Remedies for Endemic Diseases.
Peltz, Samuel H.	Schuylkill Falls,	Philadelphia,	Pa.	Intermittent Fever.
Plunkett, Philip M.	Wilmington,		Del.	Gunshot Wounds.
Purdy, Silas	Amherst,	Cumberland,	N. S.	Rubeola.
Raub, Jno. A.	Blairstown,	Warren,	N. J.	Opium.
Rice, John M.	Philadelphia,		Pa.	Delirium Tremens.
Richardson, J. G.	Philadelphia,		Pa.	Primary Treatment of Burns.
Richardson, M. C. B.	New Berne,	Craven,	N. C.	Gunshot Wounds.
Roberts, Jacob	U. S. A.			Typhoid Fever.
Robinson, Charles M.	Fairfield,	Adams,	Pa.	Diphtheria.
Rogers, Richard R.	Trenton,	Mercer,	N. J.	Duties of a Physician in the Lying-in Chamber.

NAME.	TOWN OR P. O.	COUNTY.	STATE.	SUBJECT OF THESIS.
Ruch, S. W.	Allentown,	Lehigh,	Pa.	Peritonitis.
Saville, John J.	Denver City,		Colorado Ter.	Diseases of the Rocky Mountain Region.
Sawyer, Robert G.	Harbor Island,		West Indies.	Epidemic Cholera.
Saylor, John H.	Columbus,	Franklin,	Ohio.	Dysentery.
Shirk, Adam	Jonestown,	Lebanon,	Pa.	Unhealthy Ulcers.
Smith, T. W. T.	Warwickshire		England.	Erysipelas.
Stovell, Matthew	Philadelphia,		Pa.	Collodion.
Styer, Charles	Norristown,	Montgomery,	Pa.	Enteric Fever.
Taylor, Joseph	Kennett Sq.	Chester,	Pa.	Circulation of the Blood.
Thomas, Richard, Jr.	Trenton,	Mercer,	N. J.	Arsenical Poisoning.
Todd, James Reeve	Barbadoes,		West Indies.	Typhus Fever.
Townshend, A. S.	Amherst,		Nova Scotia.	Hæmoptysis.
Turner, A. Paul	New Harmony,	Posey,	Ind.	Hemorrhoids.
Wedel, H. R.	Winona,	Winona,	Minn.	Lead and its Preparations.
Welsh, Thomas, Jr.	Davidsonville,	Ann Arundel,	Md.	Vis Medicatrix Naturæ.
Wood, Horatio C., Jr.	Philadelphia,		Pa.	Enteric Fever.
Young, I. Gilbert	Kensington,	Philadelphia,	Pa.	Croup.
Young, J. Watson	Lambertville,	Hunterdon,	N. J.	Pneumonia.
				Total . . 92

JEFFERSON MEDICAL COLLEGE—SESSION 1862-63.

The Session will commence on Monday, the 13th of October, with a General Introductory Lecture by one of the Professors. The regular lectures will begin the day after. The Session will terminate on the last day of February.

Robert M. Huston, M. D., Emeritus Professor of Materia Medica and General Therapeutics.
Charles D. Meigs, M. D., Emeritus Professor of Obstetrics and Diseases of Women and Children.

Institutes of Medicine, ...	By Prof. Robley Dunglison, M. D.
General, Descriptive and Surgical Anatomy, .	" Joseph Pancoast, M. D.
Chemistry, ...	" Franklin Bache, M. D.
Institutes and Practice of Surgery, . .	" Samuel D. Gross, M. D.
Materia Medica and General Therapeutics, .	" Thomas D. Mitchell, M.D.
Practice of Medicine, ...	" S. Henry Dickson, M. D.
Obstetrics and Diseases of Women and Children,	" Ellerslie Wallace, M.D.

Clinics will be held regularly in September; and every Wednesday and Saturday in October, and during the course, Medical and Surgical cases will be investigated, prescribed for, and lectured on before the Class. During the year ending March the first, 1862, a large number of medical and surgical cases were treated, and numerous surgical operations performed; among them many of the most important.

The lectures are so arranged as to permit the student to attend the clinics of the Pennsylvania Hospital, and the Philadelphia Hospital.

On and after the 1st of October, the dissecting-rooms will be open, under the direction of the Professor of Anatomy and the Demonstrator.

FEES.

Matriculation, which is paid only once, ...	\$ 5
To each Member of the Faculty \$15, ...	105
Graduation, ...	30

ROBLEY DUNGLISON, M. D.,
Dean of the Faculty.

BOYLSTON MEDICAL PRIZE QUESTIONS.

The Boylston Medical Committee, appointed by the President and Fellows of Harvard University, consists of the following Physicians:—

Edward Reynolds, M. D.	J. B. S. Jackson, M. D.	Charles G. Putnam, M. D.
John Jeffries, M. D.	J. Mason Warren, M. D.	Morrill Wyman, M. D.
S. D. Townsend, M. D.	D. H. Storer, M. D.	Henry J. Bigelow, M. D.

At the Annual Meeting of the Committee on Wednesday, August 6th, a premium of Sixty Dollars, or a gold medal of that value, was awarded to Francis Minot, M. D., of Boston, for the best dissertation on the question—

On Nausea and Vomiting, as Symptoms: under what circumstances do they occur, and what indications do they afford as to the seat and character of disease?

The following are proposed for 1863:—

1. *On Trephining the Skull for Injury or Disease.*
2. *On Leucocythæmia.*

Dissertations on these subjects must be transmitted, post paid, to Edward Reynolds, M. D., *on or before the first Wednesday of April*, 1863.

The author of the best dissertation considered worthy of a prize on either of the subjects proposed for 1863, will be entitled to a premium of *ninety dollars*, or a gold medal of that value.

The following questions are proposed for 1864:—

1. *On the Treatment of Fractures without Splints.*
2. *The Remittent Fever now prevailing in the United States Army.*

Dissertations on these subjects must be transmitted as above, *on or before the first Wednesday in April*, 1864.

The author of the best dissertation considered worthy of a prize for 1864, will be entitled to a premium of *ninety dollars*, or a gold medal of that value.

Each dissertation must be accompanied by a sealed packet, on which shall be written

BOYLSTON MEDICAL PRIZE QUESTIONS—Continued.

some device or sentence, and within which shall be inclosed the author's name and residence. The same device or sentence is to be written on the dissertation to which the packet is attached.

The writer of each dissertation is expected to transmit his communication to Edward Reynolds, M. D., President of the Board, in a legible handwriting, within the time specified.

All unsuccessful dissertations are deposited with the Secretary, from whom they may be obtained, with the sealed packet unopened, if called for within one year after they have been received.

By an order adopted in 1826, the Secretary was directed to publish annually the following votes:—

1st. That the Board do not consider themselves as approving the doctrines contained in any of the dissertations to which premiums may be adjudged.

2d. That in case of publication of a successful dissertation, the author be considered as bound to print the above vote in connection therewith.

J. MASON WARREN,
Secretary.

Publishers of newspapers throughout the country are respectfully requested to notice the above.

HARVARD UNIVERSITY.

SUMMER SESSION OF THE MEDICAL DEPARTMENT.

The Annual Course of Summer Instruction in the Medical Department of Harvard University will commence at the Massachusetts Medical College, in North Grove Street, Boston, on Monday, March 10, 1862, and continue till November.

Clinical, Medical and Surgical Instruction will be given at the Massachusetts General Hospital, adjoining the College.

Recitations from approved text-books will be held daily during the session at the College, upon all branches necessary to a medical education. Occasional lectures are also given, and demonstrations, illustrated by the Museums of the College.

During the Summer Session, instruction is given by lectures at Cambridge, on Botany, by Prof. Gray; on Comparative Anatomy, by Prof. Wyman; on Zoology, by Prof. Agassiz; on Acoustics and Optics, by Prof. Lovering. To these lectures, students of the Summer Session will be admitted without extra charge.

Good Board can be obtained at $3 00 or $4 00 per week.

Fees for the Summer Term (which must be paid in advance), $100, without extra charge for Matriculation, Hospital, Library or Dissections; for six months, $100; for three months, $50.

D. Humphreys Storer, M. D.,	Professor of Obstetrics and Medical Jurisprudence.
John B. S. Jackson, M. D.,	Professor of Morbid Anatomy.
Henry I. Bowditch, M. D.,	Professor of Clinical Medicine.
Oliver W. Holmes, M. D.,	Professor of Anatomy and Physiology.
George C. Shattuck, M. D.,	Hersey Professor of the Theory and Practice of Medicine.
Henry J. Bigelow, M. D.,	Professor of Surgery and Clinical Surgery.
John Bacon, M. D.,	Professor of Chemistry.
Edward H. Clarke, M. D.,	Professor of Materia Medica.

David W. Cheever, M. D., Demonstrator.

Wm. E. Coale, M. D., Assistant in Theory and Practice.
Francis Minot, M. D., Assistant in Theory and Practice.
Richard M. Hodges, M. D., Assistant in Surgery.
Calvin Ellis, M. D., Assistant in Morbid Anatomy.
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